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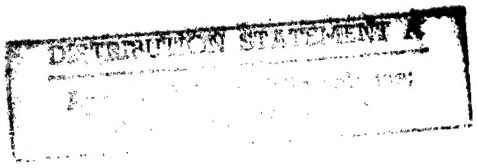
USSR Report

SCIENCE AND TECHNOLOGY POLICY



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CONTENTS

NEW MINING EQUIPMENT REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 36, Sep 83 p 2

[Article, prepared by the division of mineral resources of the USSR State Committee for Science and Technology: "New Mining Equipment"]

[Text] The coal industry is making a weighty contribution to strengthening the country's fuel and energy potential. During the years of the Ninth and Tenth Five-Year Plans, the extraction of coal in the USSR Ministry of the Coal Industry increased by almost one million tons, and a considerable amount of work was done for technical re-equipment of the branch, including the mines.

As a result of the introduction of new technical equipment, there was further development of effective means of conducting mining work in coal mines, and primarily:

the extraction of coal from comprehensively mechanized stopes, in which the labor productivity of the workers was 1.5-2 times greater than in long-wall mines that were equipped with narrow-grasp equipment with individual supports;

the conducting of mining by tunneling combines that provide for a two-three-fold increase in labor productivity and speed as compared to the bulldozer method.

The miners are now working under the more difficult conditions of deep levels. During the decade the depth of mining work has increased by one hundred meters and has reached an average of 470 meters, and in the Donbass it is more than 620 meters.

Nonetheless, the volumes of production of progressive new technical equipment have not provided for using it in all of the mines, which has made it impossible to counteract the negative influence of the constantly deteriorating mining and geological conditions for working coal deposits. For this reason, in a number of coal basins the volume of extraction has remained at the previous level or it has even decreased, and there has been a reduction of the main technical and economic indicators of the branch.

The 26th Party Congress set the task of accelerating the development and assimilation of series production of highly productive sets of equipment for long-wall mining and delivery of coal under difficult mining and geological conditions and conducting preparatory developments as well as improving the conditions for labor and technical safety. Under the Eleventh Five-Year Plan, we are implementing the scientific and technical program, "To Develop and Assimilate Technical Means for Underground Extraction of Coal Under Difficult Mining and Geological Conditions That Provide for Intensification of Production, Increased Labor Productivity and Work Safety."

For Complete Mechanization

In keeping with the program, we are creating four technological processes and 30 kinds of equipment for long-wall mining and delivery of coal, conducting mining developments, controlling the roofs in the stopes, and transporting coal along the main developments. All the technological processes and 17 kinds of equipment should be brought to the point of industrial assimilation by the end of the five-year plan and experimental models should be produced for six kinds of equipment.

Industrial testing has been conducted on experimental models of sets of coal extracting equipment of the KMT type for gently sloping beds with the capacity of 1.1-2 meters with roofs that are difficult to collapse and of the KG type for steep beds with a capacity of 0.7-1.2 meters with weak roofs and sliding soil. Serious production has been started on highly productive 3-OKP-70 and 4-OKP-70 sets of equipment which have a high technical level, for working gently sloping beds with an average capacity.

The KM-103 set of purification equipment has been manufactured and tested successfully. It is intended for mechanization of extraction from thin (0/7-1.2 meters) gently sloping beds of coal with difficult mining and geological conditions. This is a most important object of new technical equipment. Miners of the Yasinovskaya-Glubokaya mine in the Donbass, where the KM-103 was tested, gave it a high rating. This set of equipment has higher technical specifications than the best domestic and foreign analogs with respect to the working resistance, the size of the initial settings of pit props and the head lagging.

We are providing for complete mechanization of work in the long walls. It has become impossible to extract coal without grooves. The high level of the working resistance and the initial distance between the supports, the mobile sections of supports in contact with the roofs, the existence of two passages per long wall, the improved airing of the bed as the result of the increased sizes of the sections of supports make the KM-103 a safe machine under the most difficult conditions.

The labor productivity of one worker during the period of industrial testing of the sets of equipment when mining beds with a capacity of from 0.71 to 0.95 meters amounted to 21.2-29 tons per shift, and the average

daily extraction of coal was 800 tons, a 1.5-fold increase over the series produced sets of equipment Donbass and KMK-97. The introduction of the KM-103 provides for reducing the cost of extracting coal by ten percent. It saves the labor of ten men for each 1000 tons of coal. The annual economic effect from the set of equipment amounts to 350,000 rubles.

Table Mining Work Done by Combines (kilometers)

1970	1047.3
1975	1683
1980	1856
1985	2300 (Plan)

Miners, especially in the Donbass, have been waiting a long time for such a machine. But the volumes of production envisioned by the state plans for 1982 and 1983 turned out to be too much for the USSR Ministry of the Coal Industry. The ministry (deputy minister--V. Gerasimov) did not take prompt measures for technological preparation of the Kamenskiy Machine Building Plant for producing the KM-103.

As a result, instead of 25 sets of equipment, according to the 1982 plan, only five sets were manufactured, and they required the expenditure of a large amount of money to complete them and eliminate defects. The arrears are continuing in 1983. The situation that has arisen with respect to the production of the KM-103 sets of equipment have a negative effect on the basic indicators of the technical level of stoping work.

One of the important directions for increasing the efficiency of preparatory work in coal mines is to accelerate the creation and introduction of sets of tunneling equipment that make it possible to mechanize all operations, including reinforcing the mining areas which at the present time is done mainly by hand. Here one provides for increasing the labor productivity of the tunnelers and the speed of mining developments 1.5-fold as compared to the combine method of tunneling. In spite of this, because of the inadequate attention on the part of the Ministry of Heavy Machine Building (deputy minister--Ye. Matveyev) and the Ministry of Chemical Machine Building (deputy minister--V. Reznichenko), there has been a long delay in the creation and assimilation of the Soyuz-19U set of tunneling equipment for main developments through rock with average and higher than average strength, including that which can shatter. An experimental model of this set of equipment should have been manufactured as early as 1981. But we are still waiting for this even now.

Reserves of the Machine Building Base

The fulfillments of the assignments of the scientific and technical program are inseparably related to improvement of the machine building base of the USSR Ministry of the Coal Industry and its all-union production association Soyuzuglemash, and the effectiveness of the creative research

of branch scientific research institutes and design bureaus. The technical level of the machine building products produced by enterprises of the USSR Ministry of the Coal Industry is periodically evaluated by commissions of the State Committee for Science and Technology.

In 1982 the proportion of items of the highest quality category in the overall volume of production at plants of Soyuzuglemash increased to 25.3 percent as compared to 23.4 percent in 1981. On a level with the best foreign models are the base models of SP202, SP87P, and SPTs161 scraper conveyers, and the 4PU, PKZr and GPKS entry-driving machines. The ANShch, 1AShchM and AKZ sets of coal mining equipment (for beds with a steep decline) have no analogs at all in terms of their technical data.

Additionally, the evaluation of equipment for extracting coal by the underground method shows that 16.4 percent of the items should be removed from production because they are outdated, 23.2 percent should be modernized and only 60.3 percent correspond to the best domestic and foreign achievements in terms of their technical level. The proportion of products of the highest quality category in a number of plants of Soyuzuglemash is considerably lower than that achieved by the best enterprises of the all-union production association. The Druzhkovskiy and Gorlovskiy machine building plants lag behind in terms of this indicator, and the Skopinskiy, Kiselevskiy imeni I. S. Chernykh and Kamenskiy plants do not produce any products with the Emblem of Quality at all.

The branch scientific research and planning and design institutes also make various contributions. The proportion of items with designs of Giprouglemash in the overall volume of production of items with the Emblem of Quality in Soyuzuglemash exceeds 26 percent, in TsNIIpodzemmash--close to 20 percent, and Dongiprouglemash--four percent and Giprouglegormash--ten percent. Sibgiprogormash does not have a single certified item to its credit.

Among the 49 items of the branch that were certified in 1982 for the highest category, the proportion of the basic kinds of equipment for underground extraction of coal was still small, including stoping machines, mechanized timbering equipment and conveyers. The time periods for creating new technical equipment reach five-seven years.

One of the reasons for the inadequate technical level of the products that are produced by plants of the USSR Ministry of the Coal Industry is the lack of predictions of the parameters of equipment for the long-range future and an evaluation of the quality of technological processes. Standardization and unification of mining machines and processes, technological supply and metrological support of production are not as high as they could be.

The method of powder metallurgy is practically not applied in the branch. The process of gas thermal spraying is being introduced at slow rates. There are no capacities for producing heavy stampings or hammers with a force of more than five ton-force. In the structure of the machine tools, equipment for finishing operations amounts to 7.3 percent as compared to 12 percent for machine building as a whole.

Stockpile for the Future

A number of scientific and technical programs involve the development and introduction of means and methods of avoiding certain blasts of rock, coal and gas, reducing excess gas in mining development and fighting against methane explosions and coal dust.

As was already noted, the conditions for underground development of coal deposits are constantly becoming more complicated. Yet, the national economy's need for coal in the near and distant future remains significant. Therefore, the essential task is to develop technological processes that are carried out with minimal utilization of manual labor or methods of mining that do not involve human beings. This task can be carried out through automation in stopes and prepatory beds.

Robot equipment can play an important role in solving this problem. The area of application of the models created according to the program embraces the majority of coal basins with difficult mining and geological conditions, and also the enterprises of other branches that extract minerals by the underground method. It should be noted that there are no effective discoveries in this area in foreign practice, although developments are being carried out in all of the main coal mining countries.

Under the Eleventh Five-Year Plan, the search in this direction was started within the framework of the subprogram, "To Create and Assimilate Automated Manipulators for the Coal Industry." It consists of 27 assignments.

We are speaking of sets (aggregates) of technological and automated equipment, including remote control and automated manipulators (industrial robots) for extracting coal in stopes. The experimental industrial testing of this technology is to be conducted in 1990-1995. The changeover to industrial assimilation, which should provide for doubling the labor productivity, is to begin in 1995-2000.

Reduced-operation flow line technology for mining developments utilizing sets of tunneling equipment with automated manipulators and automated control is very significant. This is to be applied in mining areas with a large cross section. The changeover to this technology instead of the existing technology will make it possible to reduce the labor-intensiveness of mine tunneling work to less than two-thirds the previous amount and the proportional current expenditures--by ten-fifteen percent. This is also a reserve for the future.

Sets of equipment with automatic manipulators and remote control for auxiliary processes will also be assimilated.

A decree was recently adopted by the CPSU Central Committee and the USSR Council of Ministers which earmarked a complex of measures directed toward providing in the next few years, on the basis of accelerated introduction of progressive technological processes, for the output by domestic industry of machines, equipment, instruments and other products whose indicators are as good as the best foreign models.

The implementation of the programs for solving the most important scientific and technical problems of the coal industry completely and within the established time periods will make it possible to carry out another radical technical renovation of the branch.

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COMMITTEE ANNOUNCES PROJECTS ENTERED IN COMPETITION FOR STATE PRIZES

Kiev PRAVDA UKRAINY in Russian 4 Aug 83 p 3

[Text] The UkSSR Committee for State Prizes in Science and Technology under the UkSSR Council of Ministers reports that the following projects have been accepted in the competition for the 1983 UkSSR State Prizes in Science and Technology:

I. 1. Gavrilov, Igor' Vladimirovich; Duma, Dmitriy Pavlovich; Kislyuk, Vitaliy Stepanovich; Korsun', Alla Alekseyevna; Kur'yanova, Antonina Nikitichna; Fedorov, Yevgeniy Pavlovich; and Yatskiv, Yaroslav Stepanovich; a series of studies on "The Theoretical Development and Practical Construction of Coordinate Systems for Geodynamic, Selenodesic, and Space Research".

The work was submitted by the Main Astronomical Observatory of the UkSSR Academy of Sciences.

2. Bogomolov, Sergey Ivanovich; Burlakov, Anatoliy Vasil'yevich; Vorob'yev, Yuriy Sergeyevich; Goloskokov, Yevgeniy Grigor'yevich; Zarubin, Leonid Aleksandrovich; Kantor, Boris Yakovlevich; Podgornyy, Anatoliy Nikolayevich; Ugol'nikov, Viktor Vasil'yevich; and Filippov, Anatoliy Petrovich; a series of studies on the durability of power machinery and practical incorporation of this equipment in turbine building.

The work was submitted by the Machine Building Problems Institute of the UkSSR Academy of Sciences.

3. Isakhanov, Georgiy Vakhtangovich; Bazhenov, Viktor Andreyevich; Veryuzhskiy, Yuriy Vasil'yevich; Gulyayev, Valeriy Ivanovich; Dekhtyaryuk, Yevgeniy Semenovich; Zav'yalov, Gennadiy Georgiyevich; Kislookiy, Vladimir Nikitich; Roytfarb, Iosif Zel'manovich; Sakharov, Aleksandr Sergeyevich; and Sinyavskiy, Aleksandr Leonidovich; a series of studies entitled "Research on Processes of Deformation in Spatial Designs Based on the Development of the Theory and Methods of Numerical Analysis and the 'Durability' Computer Program".

The work was submitted by the Kiev Construction Engineering Institute.

4. Alekseyev, Vladimir Alekseyevich; Gurskiy, Zinoviy Aleksandrovich; Dutchak, Yaroslav Iosifovich; Il'inskiy, Aleksandr Georgiyevich; Kuz'menko, Petr

Pavlovich; Lysov, Vladimir Ivanovich; Prokhorenko, Viktor Yakovlevich; Romanova, Aleksandra Vasil'yevna; Fedorov, Valentin Yevgen'yevich; and Khar'kov, Yevgeniy Iosifovich; a series of studies entitled "Experimental and Theoretical Research on the Physics of Liquid Metals".

The work was submitted by Kiev State University imeni T. G. Shevchenko.

5. Kremnev, Oleg Aleksandrovich; Kravchenko, Yuriy Sergeyevich; Butskiy, Nikolay Dmitriyevich; Olevskiy, Viktor Markovich; Ivanov, Mark Yefremovich; Kholin, Boris Georgiyevich; Klopovskiy, Boris Alekseyevich; Shevtsov, Anatoliy Yefimovich; Pashchenko, Grigoriy Samoylovich; and Nazarov, Sergey Konstantinovich; "The Development and Introduction of a Process for Monodispersed Granulation of Fusions and a New Vibrogranulation Machine in the Production of Mineral Fertilizers at Nitrogen Industry Enterprises".

The work was submitted by the Technical Thermal Physics Institute of the UkSSR Academy of Sciences.

6. Kaganovskiy, Aleksandr Markovich; Meshkova-Klimenko, Natal'ya Arkad'yevna; Levchenko, Tamara Moyseyevna; Roda, Igor' Grigor'yevich; Marutovskiy, Ruslan Mikhaylovich; Gora, Lyudmila Nikolayevna; Kozhanov, Vyacheslav Alekseyevich; Makhorin, Konstantin Yepifanovich; and Glukhomanyuk, Anatoliy Markovich; a series of studies on the theory of adsorption of dissolved substances, and a process for obtaining and utilizing adsorbents for cleaning industrial waste water and using them in the technical water supply.

The work was presented by the Colloidal Chemistry and Hyrdochemistry Institute imeni A. V. Dumanskiy of the UkSSR Academy of Sciences.

7. Zerov, Dmitriy Konstantinovich; Morochkovskiy, Semen Filimonovich; Zerova, Mariya Yakovlevna; Dudka, Irina Aleksandrovna; and Smitskaya, Mariya Fedorovna; 5 volumes in the 7-volume publication "A Guide to Mushrooms of the Ukraine" (1967-1979).

The work was submitted by the Botany Institute imeni N. G. Kholodnyy of the UkSSR Academy of Sciences.

8. Lazarenko, Yevgeniy Konstantinovich; Povarennykh, Aleksandr Sergeyevich; Kukovskiy, Yevgeniy Georgiyevich; Litvin, Aleksandr Lukich; Matyash, Ivan Vasil'yevich; Platonov, Aleksey Nikolayevich; Pavlishin, Vladimir Ivanovich; Tarashchan, Arkadiy Nikolayevich; Matkovskiy, Orest Ilyarovich; and Panov, Boris Semenovich; a series of studies on "Theoretical and Regional Mineralogy".

The work was submitted by the Geochemistry and Mineral Physics Institute of the UkSSR Academy of Sciences.

9. Storchak, Petr Nikolayevich; Burdey, Andrey Ivanovich; Verigin, Mikhail Ivanovich; Gavelya, Aleksandr Panteleyevich; Guzenko, Galina Fedorovna; Kucherenko, Yuriy Fedorovich; Mikhaylova, Natal'ya Ivanovna; Moroz, Leonid Akimovich; Stepanchuk, Sergey Markovich; and Shramko, Petr Pavlovich; "Discovery and Exploration of Deposits in the Kremenchug Iron Ore Region in Poltava Oblast, UkSSR".

The work was submitted by the "Yuzhukrgeologiya" Southern Ukrainian Geological Production Association.

10. Tolochko, Petr Petrovich; Vysotskiy, Sergey Aleksandrovich; Borovskiy, Yaroslav Yevgen'yevich; Kiliyevich, Stefaniya Romual'dovna; Gupalo, Konstantin Nikolayevich; Ivakin, Gleb Yur'yevich; Movchan, Ivan Ivanovich; Sagaydak, Mikhail Andreyevich; Kharlamov, Viktor Aleksandrovich; a series of studies on the medieval history of Kiev (1972-1982).

The work was submitted by the Archaeology Institute of the UkSSR Academy of Sciences.

11. Sherstobitov, Viktor Pavlovich; Petrikov, Petr Tikhonovich; Tsaranov, Vladimir Ivanovich; Simonenko, Rem Georgiyevich; Shevchenko, Fedor Pavlovich; Brega, Galina Stepanovna; Senina, Alla Nikolayevna; Komarenko, Naina Vasil'yevna; and Panibud'laska, Vladimir Fedorovich; a series of studies entitled "Historical Ties and Friendship among the Russian, Ukrainian, Belorussian, and Moldavian Peoples in the Fraternal Alliance of Peoples of the USSR".

The work was submitted by the History Institute of the UkSSR Academy of Sciences.

12. Zvozchik, Vasiliy Grigor'yevich; Kassich, Yuriy Yakovlevich; Nechval', Ivan Timofeyevich; Kuksov, Vasiliy Pavlovich; Dubinin, Yuriy Petrovich; Shevirev, Nikolay Stepanovich; Grinev, Aleksandr Aleksandrovich; Leshchenko, Leonid Terent'yevich; Yashkov, Yevgeniy Andreyevich; and Tertishnik, Valentin Nikolayevich; "The Development and Introduction of New Processes that will Significantly Reduce the Manual Labor and Increase the Efficiency of Mass Diagnostic Tuberculosis Research on Animals".

The work was submitted by the Ukrainian Veterinary Scientific Research Institute and the Ukrainian Experimental Veterinary Scientific Research Institute.

13. Klyuy, Vasiliy Semenovich; Sobko, Aleksandr Alekseyevich; Gladkov, Serafim Aleksandrovich; Gasanenko, Luiza Stepanovna; Gasanenko, Aleksey Yakovlevich; Tereshchenko, Nikolay Mikhaylovich; Tur, Vasiliy Zakharovich; Demchuk, Anatoliy Timofeyevich; and Smutchenko, Leonid Timofeyevich; "The Development of Progressive Methods for Growing Seeds and Isolating and Putting into Production High-Yield Varieties of Alfalfa for the UkSSR Steppe Zone".

The work was submitted by the Southern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin.

14. Velichko, Vladimir Aleksandrovich; Pavliv, Stepan Vasil'yevich; Krizhanovskiy, Roman Iosifovich; Leskovich, Bogdan Mikhaylovich; Kukhar, Vladimir Mikhaylovich; Lagodyuk, Petr Zakharovich; Yanovich, Vadim Grigoriyevich; Kalachnyuk, Grigoriy Ivanovich; and Dubinka, Igor' Avgustovich; "The Development of an Integrated System for Intensifying the Production of Livestock Products on the Basis of Extensive Utilization of Scientific

Achievements and Incorporating them into the Operations of Kolkhozes in Stryyskiy rayon, Lvov Oblast".

The work was submitted by the Ukrainian Physiology and Biochemistry of Agricultural Animals Scientific Research Institute.

15. Adamovskiy, Eduard Vasil'yevich; Dadonov, Yuriy Vladislavovich; Kolyada, Vladimir Kupriyanovich; Levchenko, Yevgeniy Andreyevich; Lobenko, Anatoliy Aleksandrovich; Matuznyy, Andrey Alekseyevich; Mordkovich, Yakov Borisovich; Pavlov, Aleksandr Varlamovich; Snitko, Viktor Mikhaylovich; and Tkachenko, Vitaliy Leontiyevich; "The Development and Introduction of a Comprehensive System for Safe Shipment of Food Cargo by Maritime Transport and Protecting the Territory of the Country from the Importation of Plant Pests".

The work was submitted by the Black Sea Steamship Company.

16. Karpenko, Viktor Stepanovich; Vozianov, Aleksandr Fedorovich; Kolesnikov, Georgiy Filippovich; Kravchuk, Vasiliy Ostapovich; Lyul'ko, Aleksey Vladimirovich; Pavlova, Liliya Petrovna; Pereverzev, Aleksey Sergeyevich; Romanenko, Alina Mikhaylovna; Chernyshov, Viktor Pavlovich; and Yuida, Ivan Fedorovich; a series of studies entitled "Substantiation, Comprehensive Development, and Broad Incorporation into Medical Practice of Methods for Diagnosis, Treatment, and Prevention of Diseases of the Prostate Gland--Prostatitis, Sclerosis, and Adenomas".

The work was submitted by the Kiev Urology and Nephrology Scientific Research Institute.

17. Bilyk, Vasiliy Danilovich; Goncharenko, Sergey Ivanovich; Grando, Aleksandr Abramovich; Debov, Sergey Sergeyevich; Kryzhopol'skiy, Al'bert Moshkovich; Kkul'chitskiy, Konstantin Ivanovich; Sobchuk, Galina Semenovna; Utash, Anatoliy Vasil'yevich; and Khan, Nikolay Alekseyevich; "Formation of the UkSSR Medical Museum, Restoration of the Museum Estate of N. I. Pirogov, and Utilization of these Museums for Extensive Propaganda of the Achievments of Domestic Medical Science and Health Care".

The work was submitted by the UkSSR Ministry of Health.

18. Shumada, Ivan Vladimirovich; Panchenko, Mikhail Karpovich; Prokopova, Lyudmila Vasil'yevna; Rybachuk, Oleg Ivanovich; Kutsenko, Tat'yana Andreyevna; Aleksyuk, Konstantin Petrovich; Voloshchenko, Yuriy Vasil'yevich; and Prilipko, Timofey Il'ich; a series of studies on the comprehensive treatment of osteomyelitis and its sequelae.

The work was submitted by the Kiev Orthopedics Scientific Research Institute.

19. Marmur, Rostislav Konstantinovich; and Tsok, Rozaliya Mikhaylovna; a series of scientific research studies on the development of effective methods for ultrasound therapy and diagnosis of diseases of the eye and extensive incorporation of these methods in health care practice.

The work was submitted by the Odessa Eye Diseases and Tissue Therapy Scientific Research Institute imeni Academician V. P. Filatova.

20. Yakimov, Aleksandr Vasil'yevich; Kolomayko, Anatoliy Nikitich; Borisov, Vadim Andreyevich; Smirnov, Lev Petrovich; Grisenko, Yevgeniy Vsevolodovich; Kurnosov, Aleksandr Dmitriyevich; Boyarshinova, Roza Ivanovna; Malen'kikh, Sergey Mikhaylovich; and Zhabin, Ivan Yakovlevich; "The Development of Technological Bases for Abrasive Processing with Intermittent Instruments; their Design, Manufacture, and Incorporation into Production".

The work was submitted by the Odessa Polytechnical Institute.

21. Lyuttsau, Bsevolod Grigor'yevich; Belous, Vitaliy Mikhaylovich; Ivanitskiy, Aleksandr Ignat'yevich; Kovalev, Yuriy Viktorovich; Komyak, Nikolay Ivanovich; Kornisyuk, Viktor Sergeyevich; Lutsenko, Georgiy Ivanovich; Morozov, Yuriy Semenovich; Smelyanskiy, Vladimir Mironovich; and Khanonkin, Aleksandr Arkad'yevich; "Development and Incorporation of Physical Methods of Nondestructive Control of Wire-Drawing in the Cable Industry".

The work was submitted by Odessa State University imeni I. I. Mechnikov.

22. Sterenbogen, Yuriy Aleksandrovich; Yegorova, Svetlana Vasil'yevna; Yurchishin, Aleksandr Vital'yevich; Rubenchik, Yuliy Izrailovich; Sal'nikov, Gennadiy Alekseyevich; Bublik, Grigoriy Ivanovich; Yelkhimov, Fedor Mikhaylovich; Piven', Grigoriy Antonovich; and Nalcha, Georgiy Ivanovich; "Organization of Production of Unique Welded Structures for the Gas and Petrochemical Industry Based on the Development and Introduction of New, High Efficiency Materials and Industrial Processes".

The work was submitted by the Electric Welding Institute imeni Ye. O. Paton of the UkSSR Academy of Sciences.

23. Abramov, Fedor Alekseyevich; Zorin, Andrey Nikitich; Zabegaylo, Vladimir Yefimovich; Bol'shinskiy, Matvey Iosifovich; Petukhov, Ignatiy Makarovich; Mikolin, Viktor Ignat'yevich; and Gaynutdinov, Ivan Akzamovich; "Formation of the Theoretical Foundations, Development, and Introduction of a Set of Effective Methods for Predicting the Status and Performance of Mining Operations in Deep Mines Containing Rock Highly Saturated with Gas".

The work was submitted by the Geotechnical Mechanics Institute of the UkSSR Academy of Sciences and the State Makeyev Mining Safety Scientific Research Institute.

24. Khvatov, Yuriy Alfeyevich; Novozhilov, Mikhayl Galaktionovich; Tartakovskiy, Boris Nikolayevich; Yefremov, Ernest Ivanovich; Panchoshnyy, Nikolay Maksimovich; Savitskiy, Ivan Ivanovich; Vasil'yev, Mikhail Vladimirovich; Kikovka, Yevgeniy Ivanovich; Kolibaba, Vladimir Lavrentiyevich; and Andryushchenko, Anatoliy Vasil'yevich; "The Development and Extensive Industrial Incorporation of Progressive Cyclical-Flow Line Technology at Iron Ore Mines in the Krivoy Rog Basin".

The work was submitted by the UkSSR Ministry of Ferrous Metallurgy.

25. Beslik, Aleksey Ivanovich; Klimenko, Leonid Ivanovich; Kobelev, Foma Savel'yevich; Kolomenskiy, David Zhanovich; Kur'yanovich, Nikanor Kondrat'yevich; Lebedev, Vladimir Yevgen'yevich; Livshits, Abram Lazarevich; Otto, Mark Shmulevich; Pozdnyakov, Leonid Vasil'yevich; and Rekalov, Aleksandr Yakovlevich; "The Creation, Development of Series Production, and Broad Introduction into the National Economy of High Efficiency ShGI [expansion unknown] Feeding Sources for All-Purpose Copying and Broaching Electro-Erosion Machines".

The work was submitted by the Zaporozhye "Preobrazovatel'" [Transformer] Production Association.

26. Shul'gin, Nikolay Pavlovich; Volod'ko, Vasiliy Pavlovich; Maksimenko, Sergey Fomich; Mel'nichuk, Ivan Nikiforovich; Reznik, Nikolay Nikolayevich; Tarasenko, Leonid Petrovich; Timay, Nikolay Antonovich; and Khomyak, Yaroslav Vasil'yevich; "The Creation and Introduction of a Rational Model for the Public Highway Network in the UkSSR".

The work was submitted by the UkSSR Ministry of Highway Construction and Maintenance.

27. Dolinskiy, Anatoliy Andreyevich; Shurchkova, Yuliya Aleksandrovna; Nikolayev, Yuriy Dmitriyevich; Papernik, Yuriy Girgor'yevich; Novak, Mikhail Antonovich; Grigorenko, Grigoriy Vasil'yevich; Zatirka, Anatoliy Fedorovich; Aleksandrova, Lyudmila Mikhaylovna; and Romanyuk, Dmitriy Andreyevich; "Development of a New Manufacturing Process for Production of a Whole-Milk Substitute and its Introduction in Dnepropetrovsk Oblast".

The work was submitted by the Technical Thermal Physics Institute of the UkSSR Academy of Sciences.

28. Matviyenko, Mikhail Gerasimovich; Vasilenko, Vasiliy Ivanovich; Chernetskiy, Viktor Timofeyevich; Buzan', Yuriy Stepanovich; Gil'shteyn, Arkadiy Mikhailovich; Bovkun, Vladimir Yakovlevich; Gorgol', Ivan Ilarionovich; and Shestak, Nikolay Antonovich; "A Series of Measures for Creating and Introducing New Equipment for the Production of Consumer Goods at the Kiev Decorative Glass Plant".

The work was submitted by the Kiev Decorative Glass Plant.

II. Textbooks

1. Pyatkin, Kirill Dmitriyevich; and Krivoshein, Yuriy Semenovich; "Mikrobiologiya (s virusologiyey i immunologiyey)" [Microbiology (with Virology and Immunology)], textbook for higher education institutions; (fourth edition, "Meditsina", Moscow, 1980).

The book was submitted by the UkSSR Ministry of Higher and Secondary Specialized Education.

2. Yefimenko, Georgiy Grigor'yevich; Gimmel'farb, Abram Anatol'yevich; and Levchenko, Vasiliy Yefimovich; "Metallurgiya chuguna" [Cast Iron Metallurgy]; textbook for higher education institutions; ("Vishcha Shkola", Kiev, 1981).

The book was submitted by the UkSSR Ministry of Higher and Secondary Specialized Education.

By publishing this list of projects that are competing for UkSSR State Prizes in Science and Technology, the Committee is calling on scientific and scientific and technical societies, scientific institutions, enterprises, higher education institutions, scholars and specialists, and the general public to participate in the discussion of these projects and to offer their opinions on the content of the studies and the composition of the authors' collectives.

The titles of the studies and the members of the authors' collectives are published here as they were submitted, for the most part; more details will be provided during further discussions.

The Committee asks that responses and comments, as well as materials from public discussion of the work and the authors' collectives, be sent by 1 October to: 252021, Kiev-21, Ulitsa Kirova 18/2, room 3; the UkSSR Committee for State Prizes in Science and Technology under the UkSSR Council of Ministers.

9967
CSO: 1814/34

SCIENTIFIC AND TECHNICAL PROGRESS DIRECTED TOWARD INCREASED EFFICIENCY

Moscow PLANOVOYE KHOZYAYSTVO In Russian No 7, Jul 83 pp 3-11

[Article by Ya. Ryabov: "Improving Control of Scientific and Technical Progress and Increasing Its Effectiveness"]

[Text] The increased scale of public production and the tasks for development of the national economy under the current five-year plan and in the future require further improvement of control of scientific and technical progress and fuller utilization of its achievements. During past years, there has been an essential increase in the volumes of introduction of scientific and technical developments into the national economy. The country has created a powerful scientific and technical potential and mass invention and efficiency work have continued to grow. The discoveries of soviet scientists are the sources of new future scientific and technical directions. Large-scale results have been achieved in a number of areas of mathematics, computer and semiconductor equipment, theoretical physics, laser technology, fiberoptics, chemistry, biology and the mastery of space. Scientific and technical cooperation among the countries of the socialist community is developing successfully.

In keeping with the decree of the CPSU Central Committee and the USSR Council of Ministers concerning improvement of the economic mechanism, measures are being implemented which are being directed toward more complete accounting in the plans for the achievements of science and technology and increased motivation of production collectives to expand the output of high-quality items and to update the assortment of products. In this connection, as General Secretary of the CPSU Central Committee, Yu. V. Andropov emphasized in his speech at the June (1983) Plenum of the Party Central Committee, it is necessary to develop a system of organizational, economic and moral measures which will motivate managers, workers and, of course, scientists and designers to update the technical equipment which will make it disadvantageous to work in the old way. The changeover of industrial branches of the national economy to the autonomous financing system of organizing work for creating and assimilating production of new technical equipment will also contribute to this.

In 1982 alone, series production was assimilated for 679 new kinds of machines, equipment, instruments and materials and 145 technological processes; 366 ASUTP's [automated systems for control of technical progress] were put into operation. The 1983 plan included more than 1000 assignments for assimilating new kinds of products and more than 300 assignments for introducing new technologies and measures for mechanization and automation of production. Taking into account the plans of the ministries and departments, it is intended to assimilate a total of about 4000 new kinds of machines, equipment, instruments and materials.

In 1983 it is intended to remove from production about 2000 kinds of outdated items. (Under the Tenth Five-Year Plan an annual average of 1800 items were removed.) The savings from reducing the production costs of industrial products as the result of measures for technical progress are planned in the amount of 3.5 billion rubles as compared to 3.4 billion rubles according to the 1982 plan. The conventional release of workers in the national economy as the result of this factor will amount to approximately 2.4 million people, including 850,000 in industry. The proportion of products of the highest quality category in the overall volume will increase from 15.5 percent (1982) to 16.5 percent.

In keeping with the assignments, 170 scientific and technical programs which were approved as part of the State Plan for the Economic and Social Development of the USSR during 1981-1985, it is intended to create, assimilate and extensively introduce new technical equipment and technological processes that provide for saving on labor and material resources and improving the quality of the products that are produced.

The 1983 plan has earmarked assignments for scientific and technical problems that are being developed by the Soviet Union in cooperation with the CEMA countries on a multilateral basis.

In the plan, the section entitled "The Development of Science and Technology" envisions the creation and introduction of energy blocks with a capacity of one million kilowatts at the Kurskaya AES, the Ekibastuz-Ural electric power transmission line with a voltage of 1150 kilovolts, and the production of ethane at installations with unit capacities of 3 billion cubic meters.

The logical conclusion to the issue of improving planning and control of scientific and technical progress and increasing its efficiency is the question of the control over the fulfillment of the assignments of the State Plan. One cannot count on successful fulfillment of it if the course of implementation of the plan is not given the proper attention.

The Basic Directions for the Economic and Social Development of the USSR During 1981-1985 and the Period Up to 1990 notes that "a most important task for industry is fuller satisfaction of the demands of the national economy for means of production, and the demands of the population for consumer

goods, and intensification of production and improvement of product quality on the basis of all-around utilization of the achievements of scientific and technical progress."*

It is also intended to raise the technical level of production on the basis of the introduction of new and the expansion of the scale of application of assimilated effective resource-saving technological processes and equipment, raising the level of mechanization and automation of production processes and transport and warehouse operations; improving in all ways the quality and structure of the products that are produced as a result of more rapid growth of the volumes of the most progressive kinds of products and removal from production of outdated items; saturating the branches of the national economy with principally new kinds of technical equipment and technology; expansion of research and development on the most important areas of scientific and technical progress, and so forth.

Under the Eleventh Five-Year Plan, we are continuing to improve the structure of the national economy and increasing the proportion of the gross social product that is created in industry. We are raising the industrial level of production, which is manifested in accelerated growth rates of the branches that determine technical progress--machine building, electric energy engineering, electronics and the chemical industry.

During 1940-1980, with a twenty-fold increase in industrial production, the output of machine building products increased 72-fold, electric energy production--33-fold, and products of the chemical and petrochemical industry--58-fold. In 1980, as a result of the more rapid growth of these branches, their proportion in the overall volume of industrial production amounted to 38.7 percent (in 1965--24.3 percent).

Under the Eleventh Five-Year Plan, with an increase in industrial output of 26-28 percent, the production of items from machine building and metal processing will increase no less than 1.4-fold, and products of the chemical and petrochemical industry--by 30-33 percent. As a result of this, the proportion of products from these branches will increase even more in the overall volume of industrial production.

As early as the first years of soviet power, V. I. Lenin pointed out the need for extensive mechanization of production. "It is necessary," he wrote, "to introduce more machines everywhere, and to change over to the

*"Materialy XXVI S"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 147.

application of machine technology as extensively as possible."* The introduction of machines and mechanisms, electronic and telemechanics equipment, electronic computers and automated control systems will increase the efficiency of public production and labor productivity, and will save on it and facilitate it, especially in branches with difficult and harmful conditions and in labor-intensive and complicated processes. Depending on the application of means of labor and the nature of the technological processes carried out, mechanization and automation of production usually increase labor productivity five-ten-fold as compared to manual labor (and in individual cases, even several dozens and hundreds of times over) and they considerably reduce the cost and labor-intensiveness of the work that is performed.

In recent years automation of production has become increasingly widespread in our country, above all in such branches as electric energy engineering, ferrous and nonferrous metallurgy, the chemical industry, instrument building, and the food and light industry. Machine building is called upon to assimilate in short periods of time series production of new designs of machines, equipment, means of automation and instruments that make it possible to utilize on a large scale highly productive energy- and material-saving technology. Machine builders have been given the task of producing the necessary technical equipment which corresponds to specific conditions of operation in various branches of the national economy and regions of the country, and to considerably increase the output of systems of machines and equipment and automatic manipulators with program control which eliminate, manual, less skilled and monotonous labor, especially under conditions that are difficult and harmful to man.

It becomes very important to reduce the metal-intensiveness of machines and equipment and essentially reduce wastes and losses of metal products. To this end, measures are being implemented to improve designs of machines and equipment, the application of metal with increased durability and technological processes based on the cutting of metals is being expanded, the forming of parts is being replaced by economical methods, and in smelting we are extensively introducing electric furnaces and in forging--the method of oxygen-free heating of metal.

The task of producing machines for new technological processes is crucial. Today approximately half of the workers in industry and construction are engaged in manual labor. Consequently, it is necessary to perform an immense amount of work for mechanization and automation of basic and auxiliary production in these branches.

*V. I. Lenin, "Poln. sobr. soch." [Collected Works], Vol 42, p 153.

It was emphasized at the 26th CPSU Congress that the main condition for the creation of a material and technical base for a communist society is further acceleration of scientific and technical progress. Extensive introduction into production of the latest achievements of science and technology is becoming a central economic and an important political task from the standpoint of the class struggle between socialism and capitalism as well, "...the upper hand will be gained," wrote V. I. Lenin, "by the one that has the greatest technical equipment, organization and discipline, and the best machines..."*

Under modern conditions, automation and comprehensive mechanization of production constitute the main direction for scientific and technical progress, the basis of high rates of industrial development. The production of rapid control and computer machines and entire systems and complexes, punch care equipment and software for it, electronic regulation devices and telemechanics equipment is developing at more rapid rates than other production.

The higher industrial level of public production depends to an increasing degree on raising the technical level and improving the quality of machines and equipment that are produced, and increasing their unit capacity, economy and durability. The greater the unit capacity (productivity) of the equipment and machines, the greater the labor productivity in the national economy.

In energy machine building under the Eleventh Five-Year Plan, we shall continue to increase the production of equipment for atomic, hydro- and thermal electric power stations including atomic reactors with a capacity of 1-1.5 million kilowatts and energy blocks with capacities of 500,000-800,000 kilowatts for thermal electric power stations that operate on low-grade coal. Moreover, we are developing new designs of energy blocks with reactors with high-speed neutrons with capacities of 800,000-1,600,000 kilowatts, and equipment for highly maneuverable energy blocks with capacities of 500,000 kilowatts. The electrical equipment industry will increase the output of turbogenerators with capacities of 1-1.5 million kilowatts, sets of electrical equipment with voltages of 1,150 kilovolts of alternating and 1,500 kilovolts of direct current, powerful mainline electric locomotives, and steel smelting electric furnaces with capacities of up to 200 tons. The automotive industry will expand the production of trucks with loading and unloading devices and also container vehicles, refrigerated cars, tank cars for petroleum products and so forth. Measures have been taken for further raising the technical level and improving the quality of machines and equipment for agriculture and increasing their output and deliveries in 1983-1990.

*Ibid., Vol 36, p 116.

Technical progress in large-scale machine production means continuous development and improvement of implements of labor, technological processes and control of production, the creation of new kinds of raw material and energy, and regular growth of the technical support for the labor of the workers. Therefore, it is planned not only to increase the unit capacity of machines, sets of equipment and other implements of labor, but also to change over on an ever increasing scale to the development and introduction of systems of machines which would embrace the entire technological process. It is intended to accelerate the introduction into production of progressive reduced-operation and waste-free technology, and also technologies that save as much as possible of the initial raw material, fuel, and processed materials and have functions for environmental protection. In order to save on irreplaceable kinds of fuel, it is intended to force the development of atomic electric energy and the construction of hydroelectric power stations.

In the area of production of implements of labor, it is planned to increase the output of synthetic materials with previously given properties, to expand the assortment of rolled and bent shapes of profiles, to increase the proportion of aluminum, titanium, plastics, filled polymers and composition materials in the overall volume of construction materials, and to increase the capacities for manufacturing high-quality steels. The implementation of these plans will make it possible to raise the industrial level of industrial production and to increase its efficiency.

The main directions for improving the systems of machines and equipment can include a change in the principles and an increase in the intensiveness of their operation, the provision of rapid readjustment, and the creation of new, highly productive systems and sets of equipment. In connection with the development of electronics and missile and space equipment, the production of microminiature equipment is increasing--microengines, microinstruments and microdevices.

Thus, technical progress brings about a rapid increase in the productivity of new machines, machine tools and equipment in all branches of industry. Still, there are shortcomings in the organization of scientific research and development, the creation and assimilation of the output of new, highly effective technical equipment, the introduction of progressive technology and the control of scientific and technical progress. The division of the state plan entitled "Development of Science and Technology" is not being fulfilled altogether satisfactorily. There are considerable arrears in the fulfillment of the plan for new technical equipment in the USSR Ministry of Power and Electrification, the USSR Ministry of the Coal Industry, the USSR Ministry of Ferrous Metallurgy, the USSR Ministry of the Chemical Industry, the USSR Ministry of the Petrochemical Industry, the USSR Ministry of Power Machine Building, the USSR Ministry of Construction, Road and Municipal Machine Building, the USSR Ministry of Light and the Food Industry, the USSR Ministry of Construction Materials Industry, the USSR Ministry of the

Pulp and Paper Industry, the Main Administration of the Microbiology Industry, the USSR Ministry of Industrial Construction, the USSR Ministry of Construction, the USSR Ministry of Machine Building and the USSR Ministry of the Electrical Equipment Industry. The main reasons for the failure to fulfill assignments for the introduction of new technical equipment are delays in the construction and preparation of production, the lack of provision of batching items, defects in new equipment (domestic and imported), mistakes and incomplete developments in design and technological documentation, inefficient organization, and poor control over the course of the fulfillment of assignments on the part of the ministries, enterprises and associations.

The ministries and departments when organizing the work for conducting scientific research and creating and assimilating new technical equipment, allow unjustified duplication, do not devote the proper attention to prompt utilization and production of the most important and highly efficient inventions or the formation of the necessary testing and experimental base, do not revise promptly the organizational structures of departmental scientific research, design, planning and design and technological organizations, and do not revise the subject matter of the work they perform. As a result of this, individual organizations are still working with poor efficiency, the results of a considerable proportion of the completed research, scientific discoveries and many inventions are not rapidly and extensively applied in the national economy, and technical re-equipment and improvement of production technology are proceeding slowly.

The technical level of machine buildling products is lagging behind the increasing requirements of the national economy. Because of the prolonged time periods for the development and assimilation of new kinds of machines, equipment and instruments, the items that are produced are updated slowly. This is also impeded by the inadequate development of specialization and cooperation in production and the low level of standardization of machines, equipment, components and parts. The quality of many kinds of machine building products in a number of cases deteriorates because of violations of technology and shortcomings in the technical level of production.

The system of certification of machine building products also requires further improvement. The USSR State Committee for Standards and the ministries and departments are not taking the proper measures to improve and promptly revise standards and technical specifications for products, and they are not providing the necessary control over their fulfillment.

In a number of cases, departmental barriers impede acceleration of scientific and technical progress. The existing system of evaluating the results of the economic activity of associations (enterprises) and organizations, and economic incentives and material encouragement that are based on volume indicators do not influence effectively enough the acceleration of the creation of new technical equipment, the rise of its technical and economic level or the introduction of progressive technological processes.

The implementation of the tasks set by the 26th CPSU Congress for intensification and increased effectiveness of public production requires further improvement of control over the development of science and technology and acceleration of the rates of scientific and technical progress. In connection with the development of the concepts of the plan for the Twelth Five-Year Plan and the period up to the year 2000, the USSR Gosplan is devoting a good deal of attention to measures for accelerating the introduction of scientific and technical achievements.

In the area of improving planning and control of scientific and technical progress, it is intended to have more complete application of the special-purpose program, to increase the comprehensiveness of the solutions to scientific and technical problems, to accelerate the testing (experimental) development of new kinds of technical equipment and technological processes that are worked out using the most important inventions, and the expand the reciprocal exchange of advanced scientific and technical achievements in the branches of the national economy. Measures are being earmarked for strengthening the technical base of scientific organizations, improving their support with material and financial resources, scientific instruments and equipment, and creating reserves of production capacities for prompt preparation for the production and assimilation of new technical equipment.

Measures are envisioned for increasing the role of the consumers of the products in the development of plans of scientific research institutes and design bureaur for producing new technical equipment; and there is to be a higher level of specialization and standardization of machine building products.

It is intended to step up the influence of prices on increasing the output of items with a high technical level and quality, and also the corresponding removal from production of outdated products. It is recognized as expedient to expand considerably the work for capital repair and technical service (industrial service) by the manufacturer of machines, equipment and instruments that are being operated by the consumer.

Analysis shows that modern scientific and technical progress raises many new problems. First of all, the object of planning is changing. Traditionally, the major attention of the USSR Gosplan was directed toward the output of products--the list of them, the quantity and the quality. Here questions of planning the development of production and its technical-technological and economic levels remained secondary.

Today this approach is inadequate. It seems that questions of planning the development of production itself (and not just its results) should be the center of attention not only of the USSR Gosplan, but also the Gosplans of

the union republics, ministries and departments. It is necessary to search for better organizational forms of planning; one must have an indicator of the national economic effectiveness of new technical equipment in the mechanism of administration of the economy so that it will pervade all activity--from research to the introduction into production of the development, so that this, in the final analysis, would contribute to reducing national economic expenditures and accelerating the growth rates of the national income.

In the future it will be necessary to take a decisive step in the qualitative transformation in all elements of production (the energy base, raw and processed materials, technical equipment and technology, production organization, the production infrastructure, and so forth) and their systems on the basis of the highest achievements of scientific and technical progress as the basis for the formation of an intensive type of socialist expanded reproduction which provides for increasing the final national economic results on the paths of relative reduction of the resource-intensiveness of production and increased output-captial ratio. This process should develop on the basis of maximum utilization of the possibilities of the organic combination of the achievements of the scientific and technical revolution and the advantages of developed socialism.

The core of this transformation, in our opinion, should be the creation of flexible production which is capable of being readjusted to the manufacture of new products promptly and without large expenditures as the need for this arises. The development of the concept of the plan for the Twelth Five-Year Plan shows that there are effective ways of forming and planning this kind of production. Consequently, we are faced with a large amount of goal-directed work.

The main directions for this change are: completely providing production with adjusted technical means and systems of them; carrying out deep inter-branch and branch standardization of parts and components and standardized technologies; efficiently combining dynamism and stabilization of the list of products and considerably reducing the latter with improvement of their quality and increased satisfaction of the needs on the basis of the assimilation of progressive types and series; developing branch and territorial specialization of production, and also combining it and optimizing cooperation of large and small enterprises, expanding the production service and so forth; and creating production reserves for local maneuvering when rearranging production. One of the priority directions should be all-around deep chemization of the national economy. On the basis of this it will be necessary to solve many key problems related to the shortage of raw material and to raise the level of technology and the efficiency of production.

The general direction in the future period is to raise all branches of the economy and also the sphere of services in keeping with the advanced achievements of science, technical equipment and technology, and to considerably advance the art of all production activity. A central point in this process

should be qualitative technological transformation of production on the path of the introduction of progressive, continuous, closed and reduced-operation technologies, and also new generations of technologies. This transformation presupposes the maximum possible elimination of jobs that involve manual, monotonous and heavy physical labor, improvement of working conditions and the formation of a creative nature for it, and also attention to ecological factors in production. The main role here is to be played by automation and comprehensive mechanization of production. It is also necessary to develop those areas which reduce repair work to a minimum and make it possible to introduce industrial methods in it. It is necessary to overcome the inadequate development of the production infrastructure and its retarding influence on the growth of production efficiency, and to bring it in line with the demands of scientific and technical progress.

There should be preferential rates of development for branches and productions that provide for scientific and technical progress in the national economy and accelerated development of areas that determine the nature of the material and technical base of the future period, and also progressive structural changes in the economy and the elimination of its bottlenecks. Among these are chemical and biological production, specialized machine building, the radio electronics industry, instrument building, the production of microprocessors and equipment for the needs of the final stage of the readjusted technical equipment, technical equipment with increased unit capacities with the means of production that are necessary for its efficient functioning; interbranch manufacture of implements of minor mechanization of labor, highly effective technical equipment for auxiliary, transportation, warehouse and repair operations, and also the sphere of services; the production of high-precision profiles of metal and billets and the restoration of parts and components of mass application; the output of technical equipment that takes into account the regional peculiarities of its application; the use of containers and an efficient system of wrapping and packaging.

In the future period it is necessary to provide for an overall improvement of the quality of the most important means of production and consumer goods and a considerable expansion of the products list and volumes of production of products, primarily machine building products which are highly competitive on the world market. It is necessary to increase the proportion of repair free technical equipment which is resistant to corrosion, deformation and wear and tear, and to essentially increase its efficiency factor and also the "purity" of raw and processed materials.

When carrying out these tasks, it is important to take into account the demands of the consumer (client) for the creation of the technical equipment he needs, since he is precisely the one who is most interested in its high technical level and quality. The consumer always regards new technical equipment from the standpoint of its productivity, durability, reliability and amount of operational expenditures, comparing these parameters with those of existing technical equipment. But, unfortunately, the shortage

of technical equipment frequently does not give the consumer the opportunity to select it and he must beg the manufacturer for it, which brings about a reduction of the technical-economic and operational indicators as well as the quality of the product, and, consequently, reduced effectiveness from the introduction of new technical equipment as a whole.

With the existing provisions and methods for the formation of prices and economic incentive funds, it is more advantageous for the enterprises to produce old technical equipment with a well arranged technological process, since then, because of a certain imperfection in the existing system of economic stimulation, they achieve higher indicators of profit and deductions into the funds. And new technical equipment requires a restructuring of the technology, the manufacture of fittings, the replacement of equipment and additional expenditures during the period of preparation and assimilation of production, and it leads to a deterioration of these indicators of the activity of the enterprises. This is a crucial problem which, of course, will be resolved not only as the result of strengthening discipline and increasing the responsibility of the developers, producers, executives and planning workers, but also through improvement of economic stimulation and price setting.

A certain imbalance between prices for products and expenditures on their production is a serious cause of the retardation of the rates of introduction of new technical equipment and technology, a kind of obstacle to technical re-equipment. Therefore, the USSR Gosplan, the State Committee for Science and Technology and the USSR State Committee for Prices will have to straighten out the methods and practice of price setting on the basis of more complete accounting in prices for socially necessary expenditures and the national economic effect from the utilization of new technical equipment. An in-depth analysis of this practice would make it possible to make essential adjustments in the policy for prices which are directed primarily toward increasing the profitability of production and creating more favorable conditions for re-equipment of the national economy and increasing its efficiency. The prices for new technical equipment should be made directly dependent on its consumer qualities. Consequently, the assimilation and production of new technical equipment instead of old equipment should not worsen the indicators of the activity of the enterprise (association), but create increased motivation to update technology and the products that are manufactured.

Scientific and technical progress is developing on a planned basis and at the same time in all ways contributes to accelerated formation of a progressive organizational structure for production which takes advantage of more effective forms of its concentration, specialization, combination and cooperation. This structure is capable of offering broad opportunities for the introduction into the national economy of the achievements of the scientific and technical revolution during the period up to the year 2000 and beyond it.

During the 1980's scientific and technical progress should provide for solving such extremely important national economic problems as overcoming the tendency toward a drop in the output-capital ratio and primarily in machine building, eliminating the critical shortage of labor force, steadily reducing the energy- and material-intensiveness of production, and raising the level of production in the final stages. To do this, under the Twelth Five-Year Plan, there will be preferential development of areas with reduced resources and rapid return, which are of key significance for solving the most important national economic problems. The dominant areas should be the ones that provide for maximum utilization of the functioning production, highly effective reconstruction and technical re-equipment of enterprises and branches, increased shift work of equipment, reduced application of manual labor as the result of streamlining production and existing resources, and also complete utilization of the possibilities of the scientific-technical and production potential of the regions through improving production ties among enterprises of various ministries and departments and, if necessary, relocation of production. It is necessary to sharply increase the norm for the replacement of obsolete equipment, concentrating specialized equipment mainly at enterprises with large-series and mass production.

Under the Twelth Five-Year Plan, it will be necessary to take a decisive step in the direction of advancing the base branches of industry and the final sections in keeping with the modern level of science, technical equipment, technology and organization of production. Development should proceed at more rapid rates for production that provides for secondary, thorough and comprehensive utilization of energy, raw material and processed materials, including local kinds, and also the production of highly effective materials, including composition materials. These areas should be the first to be supplied with general and specialized equipment and other necessary resources. It will be necessary to develop on a large scale the work for reducing wastes and losses of metal, increasing the output from the same amount of raw material, improving the quality, assortment and profiles of it, and utilizing it efficiently. It is necessary to considerably raise the level of readiness for consumption of products that undergo further processing by the consumer--metal, stampings, forging, smelted metal, food products and so forth.

Important prerequisites for this are further integration of science and production; extensive utilization in the national economy of its fundamental achievements in energy engineering, genetics, biology and chemistry, microprocesses and the use of robots, the "purity" of materials and their composition, the industrially promising discoveries and large inventions; and strengthening of the testing-experimental and research base in the branches. It will be necessary to intensify the activity of scientific organizations in all stages--from research to the beginning of manufacture, with their participation in the main series of products and industrial utilization of technologies, and it will also be necessary to essentially reduce the time

periods for the development and assimilation of innovations in series (mass) production.

11772

CSO: 1814/17

PROBLEMS OF INCENTIVES FOR CREATING NEW PRODUCTS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA EKONOMICHESKAYA in Russian No 4, Apr 83 pp 37-46

[Article by A. S. Kolesnikov and V. V. Starovit "Problems of Stimulating Output of New Products"]

[Test] This article analyzes the practice of stimulating output of new products which is in effect in our country and other socialist countries. In order to improve this practice, the authors propose that inventions be classified in three groups and, on this basis, to set appropriate rewards.

Acceleration of scientific and technological progress, broad and rapid introduction to industry of achievements of science, engineering and progressive knowhow constitute an important reserve for greater intensification and improvement of effectiveness of the national economy.

"If we really want to advance the matter of introducing new equipment and new work methods," stated comrade Yu. V. Andropov, general secretary, in a speech at the November (1982) Plenum, "central economic organs, the Academy of Sciences, GKNT [State Committee for Science and Technology] and ministries ... must detect and eliminate the concrete difficulties that hinder scientific and technological progress. The union of science and industry should be aided by planning methods and the system of economic incentives. Those who proceed boldly to introduce new equipment should not find themselves in a disadvantageous position."

Implementation of the decisions in the decree of the CPSU Central Committee and USSR Council of Ministers, dated 12 July 1979, "On Improvement of Planning and Intensification of Influence of the Economic System on Increasing Effectiveness of Production and Quality of Labor," is instrumental in effective stimulation of scientific and technological progress in industrial production. In particular, this decree provides for a measure that is aimed at drastic improvement of product quality: there is a 1.5-fold increase in markup of wholesale price for new, highly effective products, as well as products given the State Seal of Qaulity in those cases where production of these items is based on procedures that have been recognized through established procedure as discoveries or inventions.

Special incentives for introduction into industry of discoveries and inventions are being used for the first time in the management practice of our country. At the present time, there are somewhat different methods of stimulating introduction of inventions in socialist countries. For example, an enterprise that has developed and introduced an invention has the opportunity to cover some of its costs at the expense of other enterprises of the socialist sector using the invention and learning how to introduce it; this has been practiced since 1968 in the People's Republic of Bulgaria and since 1972 in CSSR.

Extension of such a practice to Soviet reality could have a beneficial effect on the interest of enterprises in exchange of inventions, since it would reduce the risk and expenses involved in their introduction. However, such a step cannot solve all of the problems related to introduction of inventions developed in sectorial scientific research institutes and design offices, especially in highly scientific sectors, since it is difficult to write it into the system of cost accounting relations in our country.

Since 1969 in the Hungarian People's Republic and since 1972 in the Polish People's Republic, an invention is registered to a specific organization by means of issuing a patent; other organizations of the socialist sector can use its invention at a price, and the amount of payments for introducing this invention depends on the technical and economic effectiveness of its use. Patents for inventions (and not author certificates, as is done in the USSR) are issued in many socialist countries. For example, in the Socialist Republic of Romania, the socialist organization is also given a patent for an invention, but such a patent certifies the exclusive right of the government, while all socialist organizations can make use of such an invention without hindrance or remuneration. Thus, the legality of an invention protected in the Socialist Republic of Romania by a patent, is virtually the same as the legality of an invention protected in the USSR by an author's certificate. In the Hungarian People's Republic, a special article has been added to the law so that the rights of the patent holder would be consistent with national interests, which make it incumbent upon the patent holder to make broad use of the patented invention in the national economy, and there are provisions for issuing compulsory licenses for use of the invention to the utmost.

In the Polish People's Republic, an organization that is designated as a patent holder cannot prevent other organizations of the socialist sector from using its invention, but it can claim a share of the economic effect from such use. This feature distinguishes the right of a patent holder in a socialist organization from the right that ensues from the classical patent monopoly, which amounts in essence to forbidding use of the invention without the consent of the patent holder, which has an adverse effect on the scale of its introduction to the national economy. Just like a socialist enterprise is not the owner of state property assigned to it, but has some rights to it, which are called the right for operational control, so the socialist organization that is a patent holder does not become an ordinary patent holder, but acquires for the invention the right of operational control, the specifics of which are determined by the nonphysical nature of the object of such a right.

Adoption of such patents does not solve all of the pricing problems referable to projects developed by scientific research institutes. The latter could be based on foreign, rather than Soviet, inventions, and in this case knowhow could be acquired abroad in accordance with a license agreement and consequently pricing principles would be different. At the same time, such a patent would affect cost accounting between sectors. For example, an invention made in one sector of machine building would be included in cost accounting of all machine building sectors in accordance with its actual value, which is not taken into consideration at the present time because of the cost-free procedure for using inventions protected by author certificates. Introduction of such a patent would also require development of clearcut methods of evaluating the effect of inventions made by different organizations on the object (product) of a new technology, and for the time being such problems are being solved only in world trade by licenses and management practice in these socialist countries.

Thus, the above-mentioned decree concerning improvement of the management system in the USSR introduces a new principle for stimulating introduction of inventions, which differs from the incentive principles adopted by socialist countries. Introduction of this principle is a new stage of stimulation of scientific and technological progress, of its key element--an invention.

Essentially, author certificates are issued for inventions made in the USSR at scientific research institutions and enterprises, and by individuals. The author's certificate certifies the exclusive right of the state--socialist organizations of the USSR can make use of these inventions without hindrance and free of charge. When transmitting and using porjects containing Soviet inventions within the limits of the USSR, the management system makes no record of this, and the development of highly effective inventions has virtually no effect on the basic results of activity of organizations, and first of all scientific research institutes. This means that the latter, who develop the original technical projects based on Soviet inventions and scientific research institutes that copy foreign technical items and corresponding inventions are virtually in the same position. The only exception is when an invention is realized abroad by license agreement. Organizations (primarily scientific research institutes) who have sold the license for their inventions abroad receive a certain share of the proceeds in foreign currency, but when using it they must reimburse it with the corresponding amount in rubles. This is the only unique step that is instrumental in development and effective use of inventions that was in effect before the above-mentioned decree. In socialist countries, organizations that sell licenses abroad are rewarded to a greater extent.

There are special legal conditions for inventions, for which patents are issued in the USSR. Virtually all patents issued in the USSR belong to foreign firms. After the USSR joined the Paris convention for protection of industrial property in 1965, there was a drastic increase in number of inventions patented in the USSR by foreign firms. About 3000 patents are issued annually for inventions in the USSR. During the 15 years that a patent is in effect in the USSR, patented inventions can be used only by agreement of the patent holder and on terms proposed by the patent holder.

As we have already mentioned, until the above-mentioned decree was adopted, development and use of inventions had virtually no effect on the results of

work and incentives for employee groups of the relevant organizations and enterprises In view of the fact that the authors of inventions could be the chiefs of the corresponding scientific research institutes and enterprises, the technical policies of the sector could be less than optimal and not necessarily conform to the existing system of incentives.

The methods of determining wholesale prices and net product norms for new machinery, equipment and instruments used for industrial and engineering purposes stipulate that the markup to wholesale price is used only for the types of products, in the manufacture of which the invention is the basis or basic element. The question of whether an invention is the basis or basic element is determined by coordinated agreement between the chief producer and consumer. In other words, the choice of direction of technological progress is made by two ministries, the ministry--chief consumer and ministry--chief supplier. This is unqestionably a step forward, in the sense of greater expediency of choice of direction of technological development, as compared to the situation that existed up to 1979, where the direction of technological development was determined primarily by the ministry--producer. However, in practice, solving the question of choice encounters a multitude of problems. The fact of the matter is that an appreciable improvement of product quality can be achieved not only by making use of inventions (as the basic element), but receiving from suppliers a higher grade of raw material, engineering optimizations of the parameters of the engineering object, a good design of the object or high organizational and technical level of the enterprise as a whole.

Use of an invention in manufacture of a new product is not a guarantee that the highest technical level of production or highest economic effectiveness will be achieved. This is confirmed indirectly by the fact that only 2% of the inventions registered in the USSR are patented abroad, and only one-third to one-fourth of them are used in the national economy. The State Committee for Inventions effects expert patent-related evaluation of applications for an invention, the purpose of which is to determine whether an author certificate or patent can be issued for an original engineering idea with clearcut determination of its substance and range of rights for it. Such expertise cannot determine the possibility and expediency of using inventions in the national economy, i.e., it cannot solve a concrete question of technological policy. Any evaluation of the usefulness of an invention made in the course of patent expertise is limited in accuracy and made primarily to determine the substance of the invention and its creative nature. There are several reasons why it is impossible to determine, in the course of patent expertise, the benefit of an invention to the national economy and desirability of using it. The usefulness of an invention depends on the level of developed knowhow--additional information, without which industrial use of an invention, particularly a major one, is technically impossible or economically inexpedient. Such information, which is necessary for industrial use of the invention, is gained later by the developer, and any definition of the details of such use involves the risk of losing State priority for this invention. Any invention can be refined; the lack of methods of determining the potential usefulness and date at which it could become obsolete renders the estimates unreliable. Finally, the usefulness relationship of specific inventions (for example, varnishes)

could change because of inventions in related sectors (in this case, in methods of producing raw material for these varnishes, which could make one varnish many times cheaper than another), rather than because of their substance.

One or two work days are given to a staff member of the State Committee for Inventions for complete expert evaluation of an application, for this reason such expertise cannot duplicate the system that actually implements the technological policy of a sector. Moreover, the legislation in effect does not take into consideration that every registered invention must be more useful than existing ones, so that inventions could be deemed equivalent, equally useful, but different in technical substance.

At the same time, there could be a great economic effect from an invention that is a minor refinement in mass production of an obsolete product and, conversely, a product based on a pioneering element, a basically new invention, does not always by far yield a high economic effect in the first years of its industrial or personal use.

Since both strains of microorganisms and chemical agents, as well as technological methods could be recognized as inventions, as well as in view of the fact that in the manufacture of a new product (or use of new technique) several inventions could be used, and they can be used in the most diverse combinations, the question of practical use of markups to wholesale price of a new highly effective product becomes extremely complicated, and for the time being no methods have been elaborated to solve this problem.

In our opinion, the starting point for analysis of this complex problem could be to separate inventions into three groups, depending on the results of their use in manufacturing a product:

> Particularly important inventions, which open up basically new directions in development of industry, that technologically advanced countries must use simultaneously on a wide scale; such inventions provide for export of production on the basis of monopoly prices provided with patents abroad, or sale of licenses.
>
> Major inventions, which consist of a small group of interchangeable inventions that permit manufacture of products on a par with the best domestic and foreign specimens, with sale of licenses or product export according to oligopoly prices provided with patents abroad.
>
> Insignificant inventions, which do not yield fixed results when used abroad and differ little from engineering optimization of the technological object, that improve secondary parameters of a product.

If we refer to such particularly important inventions as the discovery of penicillin, development of nylon, transistors, etc., in their time, we can see the cost per unit of such products dropped many times since they began to be assimilated industrially, and the drop was attributable to smaller and less valuable concomitant inventions, as well as engineering optimization

of their technological production. Existing methods do not permit complete consideration of the economic effect of using particularly important inventions, while a change in parameters of technological of mass production of such a product usually permits clearcut determination of the economic effect.

A most important property of particularly important inventions is that products developed on their basis remain unsurpassed for a long period of time, and for this reason such inventions must be used extensively in all technologically advanced countries at the same time.

The significance of markup to wholesale price, which is provided by the above decree, is to stimulate a warranted technological risk, to overcome the increased technological and management difficulties related to introduction to industry of particularly important and major inventions.

There is not enough clarity in the question of who should be given the markup, just the enterprise that pioneered introduction of the invention or also those enterprises that subsequently introduce the same invention. Since the markup is set for a product, it can be assumed that it is afforded to all enterprises that assimilate the manufacture of such products. Such a solution to the problem deprives the markup of its incentive action (or reduces it in many respects), since enterprises that assimilate the invention at a later time have taken virtually none of the risk that the pioneer enterprise has taken, and they can take advantage of the knowledge and knowhow of the latter. Enterprises that assimilate production based on a Soviet invention after the pioneer enterprise are in a more favorable position, and so are enterprises that assimilate production based on major foreign inventions, since such inventions have already been introduced into practice and as a rule there is no risk. Crediting markups only to the pioneer enterprise increases appreciably the incentive for searching and assimilating output of products based on major Soviet inventions, while deprivation of enterprises that assimilate the invention at a later time of such (or commensurate) markups minimizes this incentive to some extent. In this regard, there is merit to consideration of the question of expediency of introducing differentiated markups, particularly in cases when the start of manufacture of such products involves increased economic expenditures.

The above decree provides for increasing the markup of a wholesale price for a higher quality product when manufacture of this product is based on a project that has been recognized as an invention or discovery in accordance with established procedure. The existing Statute on Discoveries, Inventions and Rationalization Proposals has no provisions for any procedures or rules to evaluate the influence of discoveries on product quality. What is registered in the USSR as a discovery (property, phenomenon, pattern in the physical world) does not have a direct effect on product quality, but the substance of some inventions coincides or evolves direction from the registered discoveries. In such cases, it is more correct to consider that the statute of the decree concerning markups also extends to inventions that open up new directions in science and technology.

The situation is somewhat better with respect to consideration of the effect of inventions on the properties of engineering objects. There is

some consideration of the effectiveness of using such inventions at the present time. The effect of such use, as determined by an enterprise in order to reward the author of the invention and individuals instrumental in its introduction, is included in the records and bulletin, VNEDRENNYYE IZOBRETENIYA [Assimilated Inventions]. No efforts have been made to coordinate the system of incentives for inventors and the system of incentives for enterprises that assimilate the manufacture of products based on the most important inventions after the previously mentioned decree was issued. Yet coordination of these two systems would not only enhance the validity of defining the size of the reward for the inventor, but its stimulating effect, since it would reduce the gap between the first use of the invention and the time when the author can claim a reward.

The size of compensations for an inventor is determined according to the economic effect of using the invention, which is determined according to the existing Methods (Basic Theses) for Determining the Economic Effectiveness of Using New Technology, Inventions and Rationalization Proposals in the National Economy, which were approved by the State Committee for Science and Technology, the USSR Gosplan, USSR Academy of Sciences and State Committee for Inventions on 14 February 1977, or according to the actual value of the invention, as determined by experts using special tables that take into consideration the positive effect of an invention, area of its use, complexity of the technical problem that was solved and creative sophistication of the project. However, there are some flaws in methods of defining inventor incentives.

The economic effectiveness of using an invention is determined in comparison to the base product, but its choice is sometimes subjective, information about base products existing abroad, which is needed for the evaluation, is not always reliable or is wanting. Moreover, a minor improvement in mass production of an obsolete product and a pioneer (opening up a new direction in science and technology) invention could have the same effectiveness. After the actual value of an invention is established, the choice of indexes for determining the size of the reward is often subjective, and this is not consistent with a complete solution of the problem of compensation in accordance with the value of an invention.

The system of rewarding an inventor is still significantly oriented toward encouraging unoriginal innovations used in mass production. When a license for an invention is sold abroad, the author receives up to 3% of the proceeds but the sum is not to exceed the existing maximum of 20,000 rubles. Of course, this has an adverse effect on orientation of both engineering creativity (inconsistency between physical and spiritual incentives) and ultimately the engineering policies, quality of manufactured product and level of satisfaction of public demand.

One of the indicators of level of technological development are the statistics on patents. The correlation between quantity of patents in a given country that are used all over the world and patents of other countries used in that given one is 13 times lower for the USSR than the United States and 10 times lower than in FRG. Of course, the lag in assimilating major Soviet

inventions and the corresponding low activity in promotion of Soviet inventions on the license market affect these figures. Separation of inventions into groups, according to the results of using them, which does not reject, but corrects the existing principles for determining the size of compensation for an invention, would provide for unity of physical and spiritual incentives, or would provide the necessary orientation of the system of stimulating technological progress. There is a similar differentiation of inventions in the Polish People's Republic (inventions and useful models), but within the framework of a different management system.

In view of the fact that, at the present time, there are virtually no conventional methods for determining the influence of inventions on the basic parameters of a product, defining the inventions that constitute the basis of a commercial product, leaving the decision as to markup over the wholesale price to the producer and consumer of the product would encounter considerable difficulties and could have an adverse effect on encouraging introduction of the greatest inventions.

The differentiation of inventions that we propose could do more than become the basis for differentiation of economic incentives for enterprises that put out products on a basically different technological level. It is more important to use it to coordinate other levers for stimulating scientific and technological progress and direct them toward achieving the highest results--to remit compensation to inventors and prizes for development and introduction of new technology.

The system of awarding prizes for development and introduction of new technology is related, to some extent, to the system of incentives for inventions. If the work plan for a new technology includes inventions, the individuals who develop such an object of new technology could receive both a prize for cooperating in introduction of the invention and a prize for new technology, for having done the same job. The maximum prize, whatever the results of the work, cannot exceed six times the salary of the job position for a specific participant in the project. Maximum payment for a single element of new technology could constitute 200,000 rubles, i.e. be higher by a factor of 10 than the payment for a major invention (20,000 rubles to the author and up to 35% of this sum as a prize for those participating in introduction of the invention).

It is known that the debate about formulation of the concept of an object of new technology lasted for more than 10 years. However, there is still nothing definite on this score. According to laws in effect, there are at least six categories of products that can be referred to as new technology: 1) product on the level of the latest advances of worldwide science and technology; 2) product that is superior to them; 3) product corresponding to the best domestic specimens; 4) product corresponding to the best foreign specimens; 5) product superior to the best domestic specimens and 6) superior to the best foreign specimens.

The specifications for new technology are not sufficiently clear; there is a time interval between the latest advances of science and technology and

implementation; on the other hand, there is no mandatory requirement that a product referable to new technology be superior to the best domestic and foreign specimens. In the Methods (Basic Theses) for Determination of Economic Effectiveness of Use in the National Economy of New Technology, Inventions and Rationalization Proposals (Item 3), an effort was made to define new technology: "new technology refers to the results of scientific research and applied projects containing inventions and other scientific and technological advances, as well as new or more refined technological production processes, tools and objects of labor, methods of organizing production and labor so that, when used in accordance with the plans of development of science and technology on all levels of management, they improve the technical-economical indicators of the product [or production] or solve social and other tasks for development of the national economy, when they are used for the first time in the national economy."

At the same time, these Methods have no clearcut criteria for classifying a project as new technology. This is understandable to some degree: a sector is limited in technical development by the existing equipment, as well as delivery of raw material from other sectors; for this reason the output of products superior to the best domestic and foreign specimens is not always possible; at the same time, solving the problem of classifying a project as new technology by the relevant agency could lead to nonoptimum technological policy in the sector, from the standpoint of interests of the national economy.

In our opinion, the flaw in defining new technology [equipment] lies in the lack of clarity as to what types of work constitute its basis. The basis of production of any new technical object and its introduction is information, which is reflected and recorded in the pertinent technical documentation, be it a technological process or machine, or lathe.

The appearance of such a relatively new form of stimulation of technological progress as rewards for new technology is attributable to a new phenomenon and most important property of scientific and technological progress, the presence of a large volume of information, without which commercial use of inventions, particularly major ones, is technically impossible or economically inexpedient, and the development of which requires considerable joint effort on the part of different specialists, and sometimes entire scientific research institutes. Most of this production is not "materialized" into finished products and is not known beyond the confines of the enterprise, and in the worldwide practice of license trade it is known as knowhow. It is expressly because of its major technical and economic significance to effectiveness of commercial production that knowhow is the object of license agreements. Knowhow is a separate, independent object of about 30% of the concluded license agreements; it is not typical for licenses for inventions be sold without the appropriate knowhow, and this happens only when the licensee does not have the opportunity to gain knowhow, but his own scientific and technical potential exists, which enables him to create the required information through his own efforts. As a rule, knowhow includes engineering optimization of parameters of production technology, specifications for raw material and equipment, methods of monitoring the technological process and quality control, methods of organizing the production process, data about the

nature of the technological process that make it possible to purposefully modify and optimize the technology itself, experience in eliminating accidents and causes of rejects, etc. Knowhow is protected by special legislation only in the Hungarian People's Republic (among socialist countries).

In the plans for new technology prepared by ministries, first to be included are the most important inventions and groups thereof, which could be either domestic (and protected in the USSR) or foreign. The economic effectiveness of both new technology based on major Soviet inventions and new technology based on foreign inventions could coincide quantitatively when evaluated by the existing method (Basic Theses) for determining the economic effectiveness of new technology, inventions and rationalization proposals used in the national economy.

It should be noted that realization of foreign inventions in objects of new technology (when there are no purely legal obstacles to this) involves virtually no technical risk, since known problems are being solved. But there is a drastically higher risk of rapid obsolescence of this new technology. The economic consequences of such a version of technological policy also include the fact that the expenses for such new technology are not returned additionall due to sale of licenses or export of products at monopoly prices for Soviet inventions patented abroad. The export of products abroad is virtually impossible, first because of patents in effect in the potential countries to which they would be exported (average of 20 years), then because it is unlikely because of trademarks and the firm foothold in the market of former patent holders.

Use of major Soviet inventions in new technology objects results in additional return of expenses for such new technology, either as a result of license sales or export at higher, patent-protected prices. The existing system of rewards for development and introduction of new technology does not take these circumstances into consideration; for this reason, there is an increased desire to avoid pioneering use of major inventions (Soviet); there is greater technical risk and more technological difficulties involved in such assimilation and, consequently, when developing new technology there is a desire to copy analogous specimens of foreign technology.

As we see it, the classification of new technology according to level of its execution should be analogous to the classification of inventions that we propose, bearing in mind that the information needed for the new technology can be viewed as the object of a license agreement. The third group of new technology in such a classification should not include major Soviet inventions or any Soviet inventions at all. The absence from this group of technology based on major domestic inventions means that there is an analogous new technology abroad, most likely an equivalent one, the technology of production of which could be acquired by license agreement. The proportion between license price and expenditures of our scientific research institution for development of equivalent specifications could be a more objective basis for compensation for development of new technology, or it could serve as the most important corrective factor in upgrading the existing system of awarding prizes. One must also bear in mind the expenses and effect of using the

new technology based on particularly important and major inventions, as well as foreign currency receipts from abroad as a result of sale of licenses or export of product at high prices protected by patents.

Apparently, it is expedient and timely to examine the question of removing the restrictions on rewards for new technology, primarily prizes for development of new technology based on particularly important inventions, as well as the question of refining the system of awarding prizes.

At the present time, the maximum reward for new technology is six times the job salary, whatever the results of the work (except for results obtained at the level of the invention, for which the author is rewarded regardless of the award for the new technology). Such a situation is unlikely to provide direction for maximum results. Unfortunately, there are still no guarantees of consistency between size of a bonus and results of the work; the guarantees could be increased by crediting authorship for the most important elements of information that constitutes the knowhow, giving prizes for this information for several years, as well as in connection with the marketing of this knowhow or product based on it abroad at higher prices. In other words, the system of giving bonuses for new technology should be supplemented with a system similar to the existing system of protecting rationalization proposals. There are no basic differences between the technical substance of inventions and rationalization proposals. The requirements as to innovativeness and creativity of rationalization proposals are considerably lower; thus, the novelty of a rationalization proposal is not discredited even by the availability of an identical finding in an enterprise's engineering library, but this makes it possible to encourage initiative to disseminate and adapt technical innovations to the conditions at an enterprise.

If we are governed by the proposed principle, rationalization proposals can also be divided into three groups in accordance with their technical level: 1) the most valuable ones, which improve development of new technology and are included in knowhow, 2) rationalizing ones, which upgrade objects of new technology and 3) rationalization proposals having no bearing on new technology. The system of rewards for new technology should also provide for determination, evaluation of the technical and economical implications, holding it in secret and using knowhow.

The different directions of incentives in effect at the present time are evident, if only from the following example. An inventor is rewarded when the license for his invention is sold abroad in an amount constituting up to 3% of the proceeds within the limits of the existing maximum size of a reward; individuals involved in selling licenses are awarded up to 5% of the proceeds. But there are no rewards for the developers of the new technology and pertinent knowhow, without which it would be simply impossible to sell licenses (or to make industrial use of the invention at all).

√ There is a separate system of incentives for development of a product that is exported, but it does not take into consideration the extent to which the product is competitive, which is determined primarily by the involvement in the basis of the product of particularly important or major Soviet inventions, as well as highly efficient knowhow. Moreover, the inventor of the product is not rewarded if the proceedings in currency are formed from exporting the

product at monopoly prices, as provided by patents for the Soviet invention, rather than from the sale of licenses.

Implementation of the statutes in the decree of the CPSU Central Committee and USSR Council of Ministers dated 12 July 1979 would provide the conditions for establishing a unified, coordinated system of incentives for inventors, teams of developers of new technology and workers at enterprises that assimilate it, that would be oriented toward achieving the maximum results.

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COMPETITION ACCELERATES SCIENTIFIC AND TECHNICAL PROGRESS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 83 pp 58-63

[Article by Ye. Ogiy, deputy chairman of the Scientific Council of the UkrSSR Academy of Sciences and the Ukrainian trade-union council for problems of socialist competition: "Socialist Competition for Acceleration of Scientific and Technical Progress"]

[Text] The 26th CPSU Congress earmarked as a most important task the acceleration of scientific and technical progress in all branches of the national economy.

The party sees in socialist competition one of the areas for combining the achievements of the scientific and technical revolution with the advantages of the socialist system of management. The struggle for acceleration of scientific and technical progress has become a permanent field of activity for the broad masses of workers and all participants in competition. The efforts of the competitors are directed toward reducing the time periods for the development and introduction of new technical equipment and technology, comprehensive mechanization and automation of production, improvement of labor organization and the assimilation and output of new items. Now there is practically not a single sphere of the national economy or region, not a single labor collective whose socialist commitments do not reflect in one degree or another these aspects of their activity. This is shown by the socialist commitments of the workers of the Ukraine for the Eleventh Five-Year Plan, which envisions assimilating 4650 new kinds of industrial products, comprehensively mechanizing and automating 8400 sections, shops and productions, introducing 11,000 mechanized flow lines and automated lines, and changing more than one million workers over from manual to mechanized labor. From the utilization of the achievements of science and technology, inventions and efficiency proposals, it is intended to obtain an economic effect of no less than 2 billion rubles annually.

Large commitments for accelerating scientific and technical progress under the Eleventh Five-Year Plan were adopted by workers of Kiev and Kharkov, Dnepropetrovsk, Donetsk, Zaporozhye and Lvov Oblasts. As was noted at a meeting of the party and economic aktiv of the republic, collectives of the

enterprises of these regions have a clear-cut scientific and technical program and they have adjusted the mechanism for utilization of scientific developments. Good results during the course of socialist competition for acceleration of scientific and technical progress are demonstrated by the following collectives: of the Mine imeni Zasyad'ko, of the Donetskugol' Association, the Kommunarsk Metallurgical Plant and the Nikopol Yuzhnotrubnyy Plant, the Severodonetsk Impul's Production Association, the Ivano-Frankovsk Prikarpatles Production Association, the Ternopol Vatra Production Association, Zaporozhtransformator, the Sumy Machine Building Association imeni M. V. Frunze, the Cherkassy Silk Combine, and many others.*

Work is being done consistently and purposefully for accelerating scientific and technical progress in the Kiev Production Association imeni S. P. Korolev. Here, socialist competition is organized under the motto "Think and decide!" and conditions have been created whereby each production worker thinks, invents, improves and develops individual creative possibilities. Because of the labor of innovators at the association, during the first year of the Eleventh Five-Year Plan, an economic effect of 2,637,000 rubles was achieved instead of the million that was indicated by the commitments.

Many enterprises have accumulated positive experience in the utilization of socialist competition as a factor in accelerating scientific and technical progress. For example, at the Chernomorsk shipyard, all workers are enlisted in the search for ways of intensifying production. Here they are developing personal and collective comprehensive plans for increasing efficiency and improving the quality of labor, which, in terms of their content, are a system of organizational and technical measures for ensuring the fulfillment of individual and brigade socialist commitments, counterplans and contracts for competition. In the measures of these plans, they take into account both the possibilities of the working position and the personal capabilities of each worker or brigade to raise the technical level of production: modernization of technological and non-standard equipment, streamlining of technological processes, assimilation and application of progressive technology, reduction of the proportion of manual and heavy labor, improvements of the quality of work, economizing on materials, and the introduction of advanced methods and devices of labor. These also include measures for specialization and improvement of the organization of the working positions (improvement of service, planning, supply of efficient organizational equipment and procurements, means of control, instruments, technical specifications, packaging, means for loading and lifting, and so forth), combining of occupations and functions, and the service of more than one machine tool.

The effectiveness of the initiatives that originated during the course of socialist competition for acceleration of scientific and technical progress is shown by the following facts. The originators of the initiative "manual labor--on the shoulders of machines" are the collectives of Zaporozhye Oblast. During the five years they implemented tens of thousands of measures concerning new technical equipment, put 634 flow lines, mechanized lines

*PRAVDA UKRAINY, 16 April 1982.

and automated lines into operation, modernized about 7000 units of existing equipment, and created 223 models of new equipment. The degree of mechanization of manual labor increased appreciably, and the number of people employed in heavy work was cut in half, which is especially important in connection with the present shortage of labor resources. In Donetsk Oblast, they have extensively adopted the initiative of the Zaporozhye workers. In 1981, 361 measures were implemented for mechanization and automation of production in industry in the oblast. As the result of the reduction of the proportion of manual, heavy and labor-intensive work, more than 11,000 people were relased and the labor of 40,000 workers was made easier.

In the leading collectives of the republic, the initiative "Manual labor--on the shoulders of machines" is augmented by more concrete tasks, which is clearly shown by their mottos: "From individual mechanisms and automated devices--to comprehensive mechanization and automation," "The engineer and technician is the one who creates," and so forth. Under the current five-year plan, problems of reducing the role of manual labor are being solved in a republic special-purpose comprehensive program, "Labor" and in 37 republic scientific and technical programs. Their implementation places special responsibility on the participants in socialist competition.

It is typical that in each oblast and branch,the competition of efficiency experts and inventors have their own inherent forms, direction and mottos. Thus, in Zaporozhye Oblast, 180 brigades of innovators are competing under the motto "From the production brigade--to the creative brigade." The defense of workers' dissertations has become widespread here. This is producing appreciable results: in the first year of the Eleventh Five-Year Plan more than 63,000 people made their suggestions for improving production. The savings from their implementation was 95,000,000 rubles, and with the commitments--90,000,000 rubles. At the Dneprovsk Aluminum Plant imeni S. M. Kirov during the years of the Tenth Five-Year Plan, they submitted 8100 proposals, and the economic effect exceeded 8,000,000 rubles. Here they created 270 new mechanized lines, machines, mechanisms and adaptors both for the basic and for auxiliary production and they developed 45 new kinds of technical equipment which were confirmed by authors' certificates. Transportation and warehouse work was mechanized by 98 percent. All this is reflected in the socialist commitments.

Under the conditions of socialist competition for increasing production efficiency and improving the quality of labor (the comprehensive form of competition) the indicators that characterize the technical creativity are the main ones when summing up the results of individual and collective competition. They have also organized special-purpose competition among shops, brigades, services, efficiency experts and inventors for the achievement of the best results in technical creativity. Reviews, competitions and exhibitions of scientific and technical creativity are held regularly. In Konstantinovka in Donetsk Oblast, engineers or organizations and enterprises have been competing for a long time under the motto "Each engineering and technical worker--an inventor and efficiency expert." This concrete

goal produces good results, the enterprises of the city are successfully fulfilling their plans and socialist commitments, labor productivity is increasing steadily, and the resource-saving direction of intensification is inherent in the majority of enterprises.

In Kharkov Oblast they have organized an oblast competition with the participation of inventors, efficiency experts, creative brigades, public design and technological bureaus, public patent bureaus, enterprises, organizations, associations, institutes and VUZ's. Under the conditions of this special-purpose form of competition, they determine for each group of competitors the indicators and methods of comparing them and the policy and time periods for summing up the results. The winners are awarded honorary titles "Best Inventor of the Oblast," "Best Efficiency Expert of the Oblast," "Best Creative Brigade," and so forth, and the collectives of enterprises and organizations are awarded Challenge Red Banners of the branch obkoms of the trade union and the oblast council of the All-Union Society of Inventors and Efficiency Experts. Bonuses are also established for each category of competitors.

More than 5000 public design bureaus have been created at enterprises to help efficiency experts and inventors. About 40,000 engineers, technicians and specialists work in them, and there are numerous public councils of innovators, schools of young efficiency experts, clubs of young technicians and exhibitions, competitions and reviews of technical creativity are held everywhere, there are 7235 public bureaus, schools, departments and institutes of patent work in operation, and there are more than 14,000 consultation points where innovators enrich their knowledge, receive reference materials regarding legal and economic questions and receive assistance in drawing up application documents. There are 2400 scientific research institutes, groups and laboratories operating on a public basis, as well as 23,000 bureaus and groups of economic analysis, 18,800 councils for scientific organization of labor and 20,000 bureaus for technical information.

For five years in a row the Ukrainian SSR has been the winner of the All-Union Socialist Competition and has been awarded Challenge Red Banners of the USSR State Committee for Inventions and Discoveries and the Central Council of the All-Union Society of Inventors and Efficiency Experts. The Presidium of the Ukrainian SSR Supreme Soviet awarded the republic organization of the All-Union Society of Inventors and Efficiency Experts a certificate of honor and the honorary title "honored inventor of the Ukrainian SSR" to 238 innovators and the title "worthy efficiency expert of the republic" to 777 innovators.

High commitments--to save more than 6 billion rubles--were adopted for the current five-year plan. The innovators are successfully meeting them. During two years of the five-year plan, 1,768,200 efficiency proposals were introduced into production, including more than 35,500 inventions with a savings of 2,865,700,000 rubles.

Participating along with all labor collectives in the fulfillment of socialist commitments for increasing production efficiency and improving the quality of work, and fulfilling the assignments of the five-year plan, engineering and technical workers, scientists and specialists of the national economy are making a worthy contribution to this cause. With their active participation, during the course of socialist competition, valuable initiatives and undertakings which are directed toward solving important problems related to technical progress originate and are realized. This is shown by the initiative of the collectives of Lvov Oblast for creating and introducing a comprehensive system for control of product quality, the Mocsow Automotive Plant imeni I. A. Likhachev for organizing socialist competition for acceleration of the introduction into production of the achievements of science and technology and, on the basis of this, increasing the capacities for producing products of the highest quality, and the collectives of Zaporozhye Oblast under the motto "Manual labor--on the shoulders of machines!" and many others which have become widespread and produced an immense economic and social effect.

In recent years, individual competition on the basis of personal creative plans has become widespread. These are a form of socialist commitments. Each year in the republic more than 1.7 million employees, engineers, technicians, scientists and other specialists develop personal creative plans. Because of their implementation, during the years of the Tenth Five-Year Plan more than 11 million measures were introduced into production, and the economic effect from their introduction amounts to more than 4 billion rubles.

Analysis shows that the movements for the development and implementation of personal creative plans is increasingly drawing in to its ranks scientists who are working in academic scientific institutions, in the system of higher schools and in branch scientific organizations. This is a natural process since the spirit of competition is inherent in the very nature of scientific creativity. Individual competition of scientific workers with personal creative plans is like the foundation of creative research in the main directions of the struggle for the success of the five-year plan, the base for the development of forms of creative cooperation between science and production and, finally, one of the powerful levers in instilling in each scientific worker a feeling of high responsibility of the quality of scientific and technical developments and their rapid utilization and production, that is, for acceleration of the rates of scientific and technical progress. Therefore the development of effective individual competition in all scientific institutions is an insistent requirement of the day. Many collectives of the country and the republic have accumulated positive experience in competition of scientific workers on the basis of personal creative plans. They include the All-Union Scientific Research Institute of Lifting and Transport Machine Building, the Kharkov VNIIElektromash, DonNIIchermet, Institutes of the Ukrainian SSR Academy of Sciences--the Institute of Electric Welding imeni Ye. O. Paton, the Institute of Cybernetics imeni V. M. Glushkov, the Institute of Problems of Material Science, The Physical and Technical Institute of Low Temperatures, and others.

In the modern stage of development of science and technology, it is becoming increasingly complicated to work out large, highly effective new technical decisions. Frequently this is not within the power of one person. Therefore in the sphere of scientific activity, the practice of organizing creative brigades has become firmly established. In many production collectives, oblasts and branches competition is organized among creative brigades. Scientists and engineering and technical workers of DonNIIchermet are the initiators of the creation of brigades for creative cooperation with production brigades of the Marten Furnace Shop of the Makeyevka Metallurgical Plant imeni Kirov. Their motto is "the contribution of the scientist--the shock labor of the worker." Because of the joint creativity of these collectives which is continuing for the second five-year plan, within short periods of time they develop and introduce many innovations. Among them is a device for blowing coal dust into the bath of the Marten furnace, technological utilization of lime, and so forth. Creative brigades of the Zaporozhtransformator Production Association have concentrated their attention on the creation of means of mechanization and automation, because of which during the Tenth Five-Year Plan, the labor of 1500 people at the enterprise was mechanized and made easier.

Firmly established in practice is creative cooperation between science and production, the forms of which are constantly being developed and improved. Agreements concerning creative cooperation are concluded both among individual collectives and enterprises and among groups of institutes, enterprises and also academies of sciences, oblasts, krays and republic ministries. Widespread recognition has been given to the creation of interdepartment special-purpose scientific production associations and complexes, and training-scientific-production assocations. These can be the most varied creative ties, not only in terms of the kinds of participants but also in terms of their number and in terms of their effect, that is, bilateral or multilateral, short-term or long-term. The tasks that are carried out on the basis of creative cooperation are also multiplanar: in terms of technical re-equipment of specific productions, and the solution to important branch and territorial scientific and technical problems. For a number of years the Kiev Plant for Automated Machine Tools imeni Gorkiy has been actively cooperating with eighteen institutes of the city. The Institute of Electric Welding imeni Ye. O. Paton in 1981 cooperated with 310 enterprises under 572 agreements.

The mobility of the creative ties among scientists and production workers makes it possible to extensively utilize the achievements of fundamental science when creating plans and design developments, to introduce them into practice more efficiently and to achieve an efficient final result. This also creates favorable conditions for comprehensive socio-economic development of enterprises, associations, kolkhozes, entire branches of the national economy and regions.

Cooperation between science and production has become closer and more effective because of the formation of scientific production associations (NPO). In the latter, it has become possible to concentrate the efforts of scientific workers, designers, technologists and production workers on joint solutions to central and particular problems of intensification on the basis of a system approach to conducting research and development and introducing the results of scientific and technical research, and thus considerably reducing the cycle "science--production." It is also possible to increase the efficiency of this chain. This is shown by the work experience of many scientific production associations. For example, the practice of the Odessa scientific production association, Kislorodmash, has shown that the cycle "science--production" decreased to two-thirds-one-half the previous amount. If at the time of the creation of the NPO, the economic effect from the introduction of scientific research work amounted to 2.31 kopecks per one ruble of expenditures, in 1980 it was 3.58 kopecks. After the creation of the NPO the creative ties between the association and scientific collectives of the country developed and became stronger.

During the course of socialist competition for acceleration of the rates of scientific and technical progress, new forms of cooperation between science and production were found: interdepartmental, special-purpose, scientific-production and training-scientific-production associations. Life has confirmed their effectiveness. They are created, as a rule, in a particular region. These forms of associations between science and production found their way into existence in Lvov Oblast where the Western Scientific Center of the republic Academy of Sciences is located. There is a large scientific potential concentrated in it: 25 VUZ's, eighteen academic institutes, and 30 branch scientific research, planning and design organizations. Each of them develops five-year, and also more long-term comprehensive plans for the development of research, the contribution to scientific and technical progress and, naturally, they are interested in stable ties with production collectives. As a rule, the interests of the institutes in many questions of research and introduction of the results into practice are interwoven. This is why it is necessary to coordinate the efforts of scientific institutions of various departments and production collectives in solving target problems which are frequently at the juncture of various branches. To this end, social scientific production associations are created, and, on the basis of them, scientific and technical complexes for implementing special-purpose comprehensive programs which solve crucial problems of technical progress both on the interbranch and on the territorial plane.

At the present time, 30 interdepartmental scientific production and fifteen training-scientific-production special-purpose associations have been created and are operating in Lvov Oblast on a public basis. They have organized socialist competition, not only at the level of the interdepartmental scientific production association or complex, but also among them for the achievement of the best final results in the implementation of the scientific and technical programs. Because of this, the volume of scientific research under special-purpose programs has increased approximately ten-fold, and the

cycle from the origin of the scientific idea to its introduction into production has been reduced to two-fifths the previous length. Such associations as Ekran, Nedra and others are operating productively.

During the years of the Tenth Five-Year Plan, creative cooperation between the republic Academy of Sciences and entire branches and regions became a reality. Under the Eleventh Five-Year Plan, the Ukrainian SSR Academy of Sciences concluded agreements for scientific and technical coooperation with Kiev and 25 oblasts of the republic as well as a number of ministries and departments. They determine a group of problems which interest both production workers and scientists for acceleration of scientific and technical progress at enterprises of a specific oblast or branch. The bases of the agreement are scientific and technical programs whose implementation involves academic and branch institutions, training institutes, scientific production associations, enterprises and organizations with a determination of the personal responsibility of their managers and specific performers of the work. The peculiarity of this cooperation is the possibility of mobilizing the scientific potential of institutions located outside a specific region in order to solve the most important regional branch problems.

There is a stronger interconnection among production collectives, scientific institutions and various departments in solving territorial-branch problems of scientific and technical progress. Thus, the basis of the agreement concluded in June 1980 by the Ukrainian SSR Academy of Sciences and enterprises and organizations of Kiev is comprised of comprehensive scientific and technical programs which are directed toward solving crucial problems related to the development of the economy of the republic's capital under the Eleventh Five-Year Plan. More than 300 enterprises and scientific research institutions, and 56 ministries and departments of the country and republic, including 17 academic institutes located in Kiev, were enlisted in their development. The development and implementation of city comprehensive special-purpose scientific and technical programs are directed toward reducing manual labor, saving on metal, providing for efficient work of the city management, implementing measures envisioned in the Food Program, increasing the effectiveness of construction and protecting and improving the environment.

But the influence of socialist competition on the acceleration of technical progress frequently cannot be fully realized because of the serious shortcomings in its organization and the existence of a whole number of problems. Thus, it has practically no influence on the process of forming the plans for the development of production, the plans for new technical equipment and technology, scientific organization of labor, scientific research and planning and design work. The socialist commitments of production collectives include at best individual parts of the plans for new technical equipment, and the rest remain outside the field of the competitors. In summing up the results of the competition, even individual parts which are included in the collective's commitments are not the main criterion for comparability, and in some cases they are simply not taken into account. This is one of

reasons for the incomplete utilization of the powerful scientific-technical and production potential, why new capacities are frequently introduced incompletely, and, moreover, sometimes on an old technological basis; the plans for new technical equipment of the ministries and departments and the subject matter for scientific institutions have many projects that are less important; with considerable expenditures on the introduction of new technical equipment, a number of enterprises do not achieve the envisioned increase in labor productivity. There was an in-depth discussion of all these shortcomings at the meeting of the party and economic aktiv that was held in April 1982.*

In spite of the fact that the competition of scientists, specialists, engineering and technical workers, creative brigades and efficiency experts has been extensively developed, many specialists in science, production and the sphere of services still do not have personal creative plans. Formalism has still not been eliminated in the competition of the right flank of technical progress. Frequently, personal creative plans do not contain measures of a creative nature, they do not have clear-cut conditions for competition, and frequently the course of the fulfillment of personal creative plans is not supervised and the results are summed up once a year.

In the organization of socialist competition according to personal creative plans there are many unresolved and questionable issues. For example, certain managers of production collectives and organizers of competition think that the personal creative plan of the engineer or technician should include only commitments of a creative nature and in no case planned measures. A legitimate question arises: does not the fulfillment of the measures in plans for new technical equipment and technology require a creative approach on the part of the worker, or is there no need to fulfill them ahead of schedule? Is this not one of the reasons for the failure on the part of a number of ministries and departments to fulfill the plans for new technical equipment?

On the methodological plane, a number of organizational issues of this kind involved in competition have been resolved: there are fairly good recommendations with respect to how one must develop the personal creative plan, the sections of which it should consist, what should be included in it, and how to establish the policy for checking on the fulfillment of the measures. Positive practice has been extensively publicized, especially in the magazine SOTSIALISTICHESKOYE SOREVNOVANIYE. But the most important problem has not been solved--how to evaluate objectively the creative plan of the engineer, scientist or specialist in agriculture or the sphere of services.

The development of criteria for comparability of the results of the fulfillment of personal and collective creative plans should be carried out on the branch level. But the ministries and departments are not displaying concern about this. When forming the coordinated plan for scientific and technical

*PRAVDA UKRAINY, 16 April 1982.

progress regarding problems of socialist competition for the current five-year plan, not a single ministry of the republic has planned such research for branch scientific institutions and has not expressed a desire for the development of such a subject on the basis of an economic agreement with the personnel of higher educational institutions or academic institutes. The lack of effective methods for comparing the results of the competition of specialists leads to subjectivism when summing up the results and providing incentives, which has a negative effect on the effectiveness of the competition and, in the final analysis, on the rates of acceleration of scientific and technical progress.

In the organization of creative cooperation between science and production we have still not studied many aspects of the methodological plane, which leads to organizational omissions. In addition to the fact that we have not yet developed a unified system of control of creative cooperation, there are no clear-cut criteria for comparability of the results of its activity, and sometimes we forget about the most elementary rules and requirements that are inherent in socialist competition. For example, in production and scientific collectives, the publicity of creative cooperation is very poorly arranged. At best, on a stand somewhere one will see the number of institutes with which the enterprise is cooperating or the number of agreements that have been concluded. The organizers of creative cooperation are active mainly in the stage of concluding agreements. They forget about the supervision of their fulfillment, about the summing up of the results with a determination of the positive experience and the difficulties that were encountered, and about the conclusions. The level and the results of creative cooperation are not taken into account when summing up the results of competition in its comprehensive forms.

In the modern stage of the scientific and technical revolution, it is necessary to speak not only about how socialist competition contributes to accelerating scientific and technical progress, but about how scientific and technical progress helps in the development of competition and in the improvement of its organization. A large step has been taken on this plane. Scientific and technical progress has given the organizers of competition modern technical equipment which provides for publicity and running accounts, calculations and analyses. This equipment includes television and remote communications installations, stand equipped with electricity, sound equipment and screens, tableaux, billboards, galleries, street fairs honoring the workers and many other things. At many enterprises and associations and on the scale of the regions they are using electronic computer equipment successfully: for giving the planned assignments to each worker and brigade, which is the basis for drawing up the commitments and personal and brigade plans for increasing labor productivity; for exercising operational control over the course of the fulfillment of commitments in all production units; for summing up the intermediate and final results of competition and determining the winners; and for providing on-the-spot information about the course and results of the competition.

The use of electronic computers in the organization of the competition increases each year. And this is a predictable process since greater demands are being placed on socialist competition. The economic, social and educational functions which it fulfills are reflected in the commitments of the competitors and in the conditions of the competition with the help of certain indicators. The number of the latter and their composition reflect the concrete influence of competition on the fulfillment of the assignments of the five-year plan, the development of the country's economy and the education of the individual. In order to make the criteria of labor competition more objective, it is becoming necessary to constantly expand the number of indicators of the competition. Therefore it is impossible to calculate them without the application of mathematical methods and modern computer equipment. Moreover, the increased effectiveness of socialist competition at all levels of administration requires the determination not of the two or three top winners, but also the overall placement of forces so that everyone knows which position he has occupied. It is practically impossible to keep such accounts by hand. Only electronic computers can do this. They are capable of giving any information to the organizers efficiently and for various periods.

But one cannot say that the work that has been conducted in the direction of expanding the utilization of electronic computers in the organization of competition and the rates of its development are satisfactory in practice. One of the reasons for the passive attitude of executives toward the application of computers for organizing socialist competition and guidance of it consists in their lack of understanding of the scientific fundamentals of the organization of socialist competition. Because of this there is still a psychological inclination toward old organizational forms which have become invalid under the conditions of developed socialism.

Two years of the five-year plan are behind us. The present stage of our forward progress requires, on the one had, a scientifically substantiated approach to the organization of socialist competition for acceleration of the rates of scientific and technical progress, and, on the other, increased responsibility of its participants. In the decree of the November (1982) Plenum of the CPSU Central Committee, "On Drafts of the State Plan for the Economic and Social Development of the USSR for 1983," it is emphasized that "great importance should be attached to strengthening state labor and executive discipline in each production section and in all spheres of administration, to increasing the organizational and business qualities in work, and extensively developing socialist competition in industry, agriculture, construction, transportation and other branches of the national economy as well as more fully utilizing intensive factors of economic development and existing reserves, economizing on all kinds of resources, improving quality indicators and achieving the highest final results with the least expenditures." Meeting these requirements is the key to increasing the effectiveness of the influence of socialist competition on the acceleration of scientific and technical progress, the growth of the country's power and the further improvement of the well-being of the soviet people.

The ways to meet these requirements and the problems related to increasing the effectiveness of socialist competition in the sphere of science are to be considered at a scientific and practical seminar in October of this year which will be conducted by the Ukrainian SSR Academy of Sciences, the Ukrainian Trade-Union Council and the Ukrainian SSR Ministry of VUZ's in Kharkov.

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PERFORMANCE OF PRESIDIUM OF THE USSR ACADEMY OF MEDICAL SCIENCES IN 1980-1981

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[Article* by N. P. Bochkov (Moscow)]

[Text] The reviewed period of work done by the Presidium of the USSR Academy of Medical Sciences coincided with the last year of the 10th Five-Year Plan, summarization of the results of five-year work and, mainly, the greatest political event in the life of our country, the historical 26th CPSU Congress.

The decisions of this congress were the deciding and guiding document for all of the Presidium's work. They reflect the main concern of the party about further improvement of the people's welfare, preservation of peace on earth and prevention of thermonuclear war. Considerable attention is given to medical science and public health in the documents and decisions of the 26th CPSU Congress.

Under the 11th Five-Year Plan, the task of further development of the preventive direction and improvement of quality of medical care of the public is advanced to the fore. For this purpose, there must be utmost use of scientific and technological achievements, modern methods of diagnosing, treating and preventing diseases in the practical public health network. The decisions and documents of the congress stress the need to increase the effectiveness of scientific, including medical, research, expedite introduction of scientific achievements to practice, deepen the ties between basic and applied investigations, to make broader use of the method of special-purpose program planning.

The work of the Presidium for the reporting period was based on the decisions of the 43d-46th sessions of the general assembly of the USSR Academy of Medical Sciences and joint session of the general assembly of the USSR Academy of Sciences and USSR Academy of Medical Sciences, which dealt with the question of further development of basic research in medicine. The decisions of the sessions reflected the priority tasks ensuing from the decisions of the 26th CPSU Congress, decrees of the CPSU Central Committee and USSR Council of Ministers, "On

*67th Session of the General Assembly of the USSR Academy of Medical Sciences dealing with current problems of oncology on 1-3 June 1982 in Gorkiy (Proceedings are published in No 12, 1982 and No 1, 1983 of this journal).

Measures for Further Improvement of Public Health," "On Further Development of Medical Science in Regions of Siberia and the Far East," "On Further Development of Physicochemical Biology and Biotechnology, and Use of Their Achievements in Medicine, Agricultural and Industry" and several others, which defined the strategy of scientific medical research.

The USSR Academy of Medical Sciences continues to grow stronger and to expand. In the years under review, the following new institutes were founded: Institute of Clinical Immunology and Institute of Therapy in Novosibirsk, Institute of Physiology and Pathology of Respiration in Blagoveshchensk, Institute of Medical Enzymology in Moscow. The All-Union Surgical Research Center in Moscow , Institute of Epidemiology and Microbiology in Vladivostok were transferred to the jurisdiction of the USSR Academy of Medical Sciences. The All-Union Mental Health Research Center was organized on the basis of the Institute of Psychiatry and Brain Institute. There has been an increase in number of affiliates in Union republics of scientific institutions of the USSR Academy of Medical Sciences. A special planning and design office with the Medbiofizpribor [Medical and Biophysical Instrument] Experimental Plant was established in the Siberian Department of the USSR Academy of Medical Sciences. The number of scientific institutions under the USSR Academy of Medical Sciences has grown from 46 to 61 as a result of expansion of research centers with their institutes, establishment of new institutes, affiliates and academy staff groups. At the present time, the USSR Academy of Medical Sciences has 4 All-Union research centers, 43 scientific research institutes, 4 scientific research laboratories, 11 affiliates and 23 academic groups. More than 30,000 people work in institutions of the USSR Academy of Medical Sciences, 6630 of whom are scientific associates; there are almost 1000 doctors and about 4000 candidates of sciences.

There has also been systematic strengthening and refinement of the material and technical base of scientific institutions of the USSR Academy of Medical Sciences. In this period, about 50 million rubles of capital investments have been acquired, which provided for putting a number of projects into operation totaling an area of 137,300 square meters. New medical and scientific equipment costing about 20 million rubles have been acquired, automated control systems have been put on line in several institutions of the USSR Academy of Medical Sciences and there was continued development of laboratory animal breeding.

The plans for scientific research under the 10th Five-Year Plan were fulfilled for 1980 and 1981. An entire series of studies were completed, of important theoretical and applied significance. Without dwelling on an enumeration of concrete results of research conducted in institutions of the USSR Academy of Medical Sciences, we should list data reflecting the achievements in the most concrete form: patents, inventions and discoveries. In 2 years 35 inventions were patented. This is one-third of all patented inventions for the USSR Ministry of Health. A total of 96 patents were obtained in 2 years from these 35 inventions. A total of 278 applications for inventions, for which 195 author certificates were issued, were submitted in 1980-1981 for completed research work. This is 70% of all applications, while the indicator for the nation as a whole is 45%. In 2 years, one discovery was registered, which was made at the VONTs [All-Union Cancer Research Center] of the USSR Academy of Medical Sciences; 3 applications for discoveries are presently being examined.

The results of basic and applied research in the field of medicine were highly rated by the party and government. They were awarded two Lenin and seven State prizes; 3 members of the USSR Academy of Medical Sciences received the honorary title of Hero of Socialist Labor and 55 received state rewards; 15 studies were awarded memorial prizes of the USSR Academy of Medical Sciences and 6 were given certificates.

The main task of the USSR Academy of Medical Sciences as the headquarters of medical science is to define the strategy of scientific medical research. The main directions of research in the field of medicine for the 11th Five-Year Plan were elaborated on the basis of a long-range combined program of scientific and technological progress and its socioeconomic consequences. After the 26th CPSU Congress and in accordance with its decisions, additions were made to this plan. It reflects the close tie between theoretical directions and the demands of modern clinical medicine. There is some increase in topics that are being worked on, by about 1500 (about 5%). More than 600 scientific institutions under different agencies participate in fulfilling the plan, with reference to more than 200 problems of theoretical, clinical and preventive medicine.

Considerably more medical research than in previous five-year plans has been planned for regions of Siberia, the Far East and Extreme North. This work will be instrumental in lowering morbidity among the adult and child population, and in reducing labor losses in these parts of our country.

As before, the USSR Academy of Medical Sciences focuses its attention on basic research. Its further intensive development is represented in particular breadth in physiology, biochemistry, immunology, genetics, pathology, virology, cardiology, oncology, etc.

Fulfillment of the planned tasks will have an appreciable influence on the development of Soviet medical science; it will enrich public health practice with a number of valuable methods for diagnosing, treating and preventing diseases; it will serve the cause of safeguarding the health of the Soviet people.

Along with the positive aspects of the plan, we should mention some of its flaws.

The planned topics dealing with problems of Union importance are not always consistent with modern times. The relevant scientific councils are not involved enough in solving some major borderline problems that require comprehensive and fundamental work by specialists in different fields. On the other hand, full use is not being made of the scientific potential to solve important problems of medical science. Some scientific councils do not always review the submitted topics at the preplan stage, which generates unwarranted duplication of scientific topics, including in the plan of projects that had already been worked on before on a rather wide scale. There is still insufficient planning of exploratory research, as well as investigation of patentability of the topics.

State programs were formulated in 1980-1981 to solve the most important problems of medical sciences. Programs dealing with cardiovascular diseases, oncology, surgery and transplantation, mother and infant care, leukemia, nonspecific lung diseases, immunology and genetics were approved by decrees of the USSR State Committee for Science and Technology.

The program for development of effective methods and means of prevention, diagnosis and treatment of the principal cardiovascular diseases would permit scientific validation of conditions to lower morbidity and mortality due to the main diseases of the cardiovascular system, as well as reduce losses resulting from temporary and permanent disability because of these diseases.

The general goal of the program for development of highly effective methods and means of diagnosing, treating and preventing malignant neoplasms in man is to lower mortality due to cancer and its incidence. There is another program close to this one, that of developing and introducing to practice pathogenetic methods and agents for the prevention and treatment of leukemia in man, farm animals and fowl. The main research on this program is concentrated on etiology and pathogenesis of leukemia, as well as development and introduction to practice of pathogenetic methods and agents for the prevention and treatment of leukemia in man, farm animals and fowl.

Fulfillment of the program to develop and introduce into clinical practice methods of reconstructive and rehabilitation surgery, transplantation and apparatus to replace organ functions is very important.

The general goal of the program for mother and infant health care (to develop effective methods for the prevention and treatment of the principal diseases of mother and infant) is to substantiate the increase in reproductive function of women, with birth of healthy offspring, means of lowering morbidity and infant mortality, and conditions for harmonious growth and development of children.

The program on immunology and genetics provides for investigation of genetic and molecular mechanisms of immunological disturbances and hereditary diseases. Methods and means of preventing, detecting and treating them will be developed on this basis.

The program for development of effective means and agents to control nonspecific lung diseases consists of three directions: 1) investigation of epidemiology of acute and chronic nonspecific lung diseases and refinement of organizational forms of pulmonological care of the public; 2) upgrading existing methods and creating new ones for detection of acute and chronic nonspecific lung diseases; 3) development of more effective methods of treating acute and chronic lung disease in adults and children.

In order to expedite the solutions to the most important problems of public health care and development of medical science, the USSR Ministry of Health approved in 1982 of a list of national sectorial programs of scientific research in the field of medicine for 1981-1985, as defined by the Presidium of the USSR Academy of Medical Sciences on the basis of the combined program for scientific and technological progress in the USSR.

The national sectorial programs were worked out by the institutions that were in charge for the program, under the supervision of scientific councils of the USSR Academy of Medical Sciences, and they were coordinated with the executing institutions. The draft of each program was reviewed by the relevant departmental offices of the USSR Academy of Medical Sciences or scientific medical council of the USSR Ministry of Health. The sectorial programs include the following parts: investigation of basic mechanisms of development, eradication and prevention of pathological processes at the basis of the most important forms of human pathology; investigation of pathogenesis, development of methods for prevention, diagnosis and treatment of the main endocrine diseases; scientific bases of transfusiology; prolonging life; control of venereal diseases; emergency care and resuscitation in the presence of critical states and trauma; viral diseases; scientific bases for control of rheumatic diseases. Another program, "Development of Dairy Products Enriched With Protective Factors for Infants up to 1 Year Old," is being formed by the Gorkiy Scientific Research Institute of Epidemiology and Microbiology, RSFSR Ministry of Health.

The USSR Academy of Medical Sciences, together with the Academy of Sciences, developed an interagency program of research on the problem of "Basic Sciences to Serve Medicine," the purpose of which is to organize the most efficient collaboration to assist in development of medical sciences and broad use of advances in physics, chemistry, biology and engineering in Soviet public health. The program consists of nine main directions, in which research will be conducted: use of physicochemical methods in medicine and biology; physicochemical biology; basic problems of human and animal physiology; scientific bases for synthesis of drugs and materials for medicine; biomedical sciences; hygiene, microbiology, virology, parasitology; clinical sciences; use of physicotechnical and mathematical methods in medicine and biology; socioeconomic aspects of medicine and health care.

The USSR Academy of Medical Sciences, together with the USSR Academy of Pedagogic Sciences, participates in the program, "Health, Rearing and Education of Children and Adolescents," covering a 10-year period. Its implementation will permit development of scientifically validated recommendations to strengthen the health of children, finding new methodological approaches to improvement of upbringing in preschool institutions and management of the pedagogic process in the school.

The Siberian Department of the USSR Academy of Medical Sciences has elaborated a combined program of scientific research, "Human Health in Siberia," which is a section of the program "Siberia"--"Combined Development of Natural Resources and Development of Productive Forces of Siberia," which is being fulfilled under the guidance of the Siberian Department of the USSR Academy of Sciences.

In the period under review, the scientific organizational activities of the Presidium of the USSR Academy of Medical Sciences were directed toward implementation of the decisions of the 25th and 26th CPSU congresses. In this regard, there were plans to implement measures to complete scientific research scheduled under the 10th Five-Year Plan and deployment of research under the 11th Five-Year Plan in accordance with the decisions of the 26th CPSU Congress. The performance of these tasks determined the nature and content of sessions of general assemblies of the USSR Academy of Medical Sciences convoked by the

Presidium and meetings of the Presidium of the USSR Academy of Medical Sciences. After the 43d reporting and election session, there were 4 more dealing with the following scientific topics: biomedical aspects of environmental protection; sociohygienic problems of health care and health in a fully-developed socialist society; current problems of mother and infant health care.

A session dealing with "Basic Sciences to Serve Medicine" convened jointly with the USSR Academy of Sciences.

In June 1981, there was a Bulgarian-Soviet jubilee session commemorating the 1300th anniversary of formation of the Bulgarian State.

In addition to sessions of the general meeting of the USSR Academy of Medical Sciences, there were regular sessions of departments. In the Clinical Department sessions were held dealing with problems of arterial hypertension and reconstructive surgery. The Department of Biomedical Sciences convoked a session on medical enzymology and a scientific methodological conference on methodological and social problems of psychopharmacology. The session of the Department of Hygiene, Microbiology and Epidemiology dealt with the problem of hygiene of nutrition. Three sessions convened in the Siberian Department. It must be noted that the scientific programs of the sessions of the general assembly of the USSR Academy of Medical Sciences and its departments, which convened in other cities, were instrumental in upgrading the level of development of medical science in the different republics and improving coordination of research.

Fulfillment of the tasks put to the USSR Academy of Medical Sciences determined the nature and content of all of its organizational work, including meetings of the Presidium of this academy. In the period under review, joint meetings of the Presidium with institutions of other agencies were started. They included a meeting in Leningrad where there was discussion of the scientific and scientific-clinical activities of the Institute of Experimental Medicine, Institute of Obstetrics and Gynecology, USSR Academy of Medical Sciences, as well as of the status and prospects for development of the basic directions of medical science and health care in that city's scientific institutions. There was a joint meeting of the Presidium of the USSR Academy of Medical Sciences with the Presidium of the Belorussian Academy of Sciences and board of the Belorussian Ministry of Health in Minsk. The meetings in Leningrad and Minsk made it possible to elaborate combined programs dealing with scientific problems in the area of medicine and, on this basis, to organize broad coordinated investigations of health care problems with the participation of scientists in different fields and disciplines. There were also visiting meetings of the Presidium of the USSR Academy of Medical Sciences in Moscow, at the All-Union Cancer Research Center of the USSR Academy of Medical Sciences, All-Union Surgical Research Center and Central Design Office with the experimental plant of the USSR Academy of Medical Sciences.

The Presidium of the USSR Academy of Medical Sciences devoted special attention to the performance of the Siberian Department, which was based on the decisions of the 25th and 26th CPSU congresses, decrees of the CPSU Central Committee and USSR Council of Ministers, "Further Development of Medical Science in Regions of Siberia and the Far East," "Measures for Further Economic and Social

Development of Regions Inhabited by Peoples of the North." One meeting of the Presidium of the USSR Academy of Medical Sciences was held jointly with a session of the general assembly of the Siberian Department of the USSR Academy of Medical Sciences, and it discussed prospects for its future development.

Members of the Presidium--A. M. Chernukh (deceased), N. P. Bochkov, L. A. Il'in, A. I. Rybakov and others--traveled to give needed assistance to different localities. Three departments (Department of Clinical Medicine, Department of Biomedical Sciences, Department of Hygiene, Microbiology and Epidemiology) examined the directions of scientific research done at institutes under the Siberian Department of the USSR Academy of Medical Sciences; performance of the Presidium of the Siberian Department and its institutes was discussed at a meeting of the Presidium.

The Presidium of the USSR Academy of Medical Sciences directed the work of the offices of all departments.

The work of the departmental offices was systematically planned and constructed with due consideration of increase in efficiency of scientific research done by institutions of the USSR Academy of Medical Sciences, concentration of efforts on the basic scientific directions and, primarily, work on problems indicated in the decisions of the 26th CPSU Congress, as well as on expediting introduction of results of research to health care practice. Details about the performance of each department are furnished in the report.

The scope and complexity of problems being solved by medical science require a combined approach, concentration of scientific teams on major and promising directions of theoretical and clinical medicine, and health care practice. It is possible to provide effective management of medical research on a national scale by establishing a unified complex system of planning and coordination of medical scientific research with broad use of computers. The Presidium devoted considerable attention to this matter.

Implementation of Lenin's foreign policy course in the peace program, which was defined in the decisions of the 26th CPSU Congress, was one of the tasks for the Presidium. A year ago, the Soviet Committee,"Physicians Against Nuclear War," was established under the Presidium of the USSR Academy of Medical Sciences, and it is chaired by Ye. I. Chazov. This committee became actively involved in the study and explanation of medical sequelae of a nuclear war. Members of this committee participate in international congresses and national conferences, working meetings; their voices are heard in the press, television and radio, in our country and abroad, on the subject of preventing nuclear war and stopping the arms race.

The Presidium of the USSR Academy of Medical Sciences, its departments, the Department of International Scientific Ties and academy institutions, together with the Administration for Foreign Affairs of the USSR Ministry of Health, have accomplished much for further development and improvement of scientific international ties. There was scientific collaboration in all forms, and it was aimed at fulfilling the obligations assumed by the Soviet side. Much attention was devoted to further fruitful collaboration with socialist nations on a multilateral and bilateral basis with regard to pressing medical

problems. The USSR Academy of Medical Sciences summed up the results of scientific collaboration with the academies of sciences of GDR, Hungarian People's Republic, CSSR and Polish People's Republic in 1976-1980, and has endorsed scientific plans for collaboration in 1981-1985. In summing up the results of collaboration, it was shown that assumed obligations were fulfilled, joint research was effective, there was strengthening of friendship among scientists and interest in further development of collaboration.

The Presidium of the USSR Academy of Medical Sciences, departmental offices, institute directors and members of the USSR Academy of Medical Sciences constantly devoted much attention to questions of screening, training and education of scientific personnel. In view of the expansion of the USSR Academy of Medical Sciences and need to improve the effectiveness of scientific research and coordinating role of head institutes, questions of improvement of the system of screening, training and education of scientific personnel for institutions of the USSR Academy of Medical Sciences are gaining particular importance. In the period under review, 65 doctors and 388 candidates of sciences were trained in institutions under the USSR Academy of Medical Sciences; 464 people completed their graduate studies and 385 finished their clinical residencies.

In accordance with the by-laws of the USSR Academy of Medical Sciences, elections of members to the USSR Academy of Medical Sciences were held twice (1980 and 1982) in the reporting period. A total of 17 new active members and 45 corresponding members were elected.

While much work was done and there was improvement of some aspects of personnel work with regard to screening and training scientific cadres, there are still some flaws. There is the wrong proportion between number of senior and junior scientific associates (1:1.3) in the structure of regular staff positions, on the one hand, and between the number of scientific associates and ancillary scientific personnel, on the other hand. Only 50% of the plan for training doctors of sciences was fulfilled and 63% for candidates of sciences. The work of most junior scientific associates without a degree was not included in the plan for preparing candidatorial dissertations. We are slow in expanding the training of young specialists through the institution of researcher-trainees. A considerable number of positions of scientific division chiefs (28%) are held by candidates of sciences, while 347 doctors of sciences hold the jobs of senior scientific associates.

Methodological and ideological indoctrination work at scientific research institutes of the USSR is under the constant supervision of the Presidium of the USSR Academy of Medical Sciences, Party Bureau apparatus of the Presidium of the USSR Academy of Medical Sciences, management and Party organizations of institutes. In the period under review, questions of ideological and methodological work were examined three times at meetings of the Presidium of the USSR Academy of Medical Sciences. In 1981, there was a Party aktiv of scientific research institutions of the USSR Academy of Medical Sciences, where the achievements were summed up and prospects outlined for further improvement of ideological indoctrination and methodological work in the light of the decisions of the 26th CPSU Congress.

A new and promising direction of our work is the study of methodological aspects of special-purpose research programs. In the last 2 years, a new form of methodological work has appeared: joint sessions of methodological seminars of institutes with specialized scientific councils or with methodological seminars of the relevant departments of medical VUZ's.

The value orientation of the physician and ethical-deontological problems of modern medicine play an important part in the current ideological struggle. These issues were submitted to in-depth philosophical and ideological analysis at a general academy scientific and methodological conference in 1980, on the topic of "Ethical and Deontological Problems of Modern Medicine." In March-April 1980, there were theoretical conferences at all institutes of the USSR Academy of Medical Sciences on the topic of "Theoretical Legacy of V. I. Lenin and Its Implications for Medical Science and Soviet Public Health." At the initiative of the Commission for Work With Young Scientists and Specialists under the Presidium of the USSR Academy of Medical Sciences, an All-Union Conference of Young Medical Scientists commemorating the 110th anniversary of the birthday of V. I. Lenin was held in Kazan, in May 1980. Virtually all of the members of the Presidium of the USSR Academy of Medical Sciences participated in it.

As we have already stated, in the reporting period some work has been done to strengthen the material and technical base of scientific research at institutions of the USSR Academy of Medical Sciences. Yet there are many flaws and unused reserves in this area. At several institutions there are infractions of staff and financial discipline. The shortfall referable to construction of facilities of the USSR Academy of Medical Sciences is almost twice the established norm. A poor quality of laboratory animals continues to be delivered to scientific institutions, and not enough work is being done to raise pure-bred animals. There is often delay in putting new equipment in operation. From year to year, the requests for needed equipment, lab coats and writing paper are not being satisfied. Nor have requests for motor transport been fulfilled; there are instances of distribution of transport that is inconsistent with requests and the approved plan. The institutes are experiencing interruptions in supplies of fuel, gasoline and feed for animals.

In summary, it can be stated that, in the period under review, the Presidium of the USSR Academy of Medical Sciences accomplished some work on organizing scientific research at institutions of the USSR Academy of Medical Sciences, personnel and material-technical strengthening of institutes. Attention was constantly given to questions of planning, coordination and forecasting the development of medical science in our country, international scientific ties, scientific-methodological and ideological-indoctrination work. All this work was done by the Presidium of the USSR Academy of Medical Sciences with the help of departmental offices, head institutes, scientific councils and members of the USSR Academy of Medical Sciences.

The main part of the report reflects flaws pertaining to the status of work on the leading directions of medical science under the 11th Five-Year Plan, scientific-organizational performance of the Presidium of the USSR Academy of Medical Sciences, administrative-management and financial activities, scientific-methodological and ideological-educational work.

The main objective of the USSR Academy of Medical Sciences and all its institutions in the next few years is to creatively fulfill the plan of measures to implement the decisions of the 26th CPSU Congress, directed toward "learning the mechanisms of physiological, biochemical, genetic and immunological processes of human vital functions, refinement of methods for prevention, diagnosis and treatment of the most widespread diseases, development of new drugs, agents and medical equipment." One of the important directions in the Five-Year Plan is to elaborate the scientific bases of primary prevention of the most widespread noninfectious diseases. For this purpose, it is necessary to concentrate most resources referable to equipment and personnel on fulfilling all programs, primarily state ones, to work on the leading scientific problems. Work must be continued on rational use of financial resources, upgrading the structures of scientific institutions, improving the effectiveness of scientific research in order to rule out unwarranted duplication and too many topics.

The rapid development of medical science is putting to the Presidium of the USSR Academy of Medical Sciences, scientific councils and head institutes problems of eliminating flaws in planning, coordination and forecasting scientific research, faster preparation of proposals for introduction of results to practice. It is imperative to continue work on analysis of the trends of development of medical science, upgrade the system of expertise and evaluation of the results of scientific research.

The groups of sciences are faced with the task of faster development of basic research, increase in number and intensification of purposefulness of research. As before, serious attention should be given to development of scientific institutions of the Siberian Department of the USSR Academy of Medical Sciences.

In view of the importance of international scientific collaboration at the present stage, it is necessary to give more attention to joint work with the WHO and to fulfill interinstitute programs.

Work on dissemination of information about the achievements of Soviet medical science must be upgraded and refined, together with the All-Union "Znaniye" Society and other organizations. It is necessary for the Soviet Committee of "Physicians Against Nuclear War" under the Presidium of the USSR Academy of Medical Sciences to continue with active work.

Work on methodological problems of modern biology and medicine should occupy an important place.

The apparatus of the Presidium of the USSR Academy of Medical Sciences and directors of its institutions should devote even more attention to effective use of financial and physical resources. It is imperative to provide more operational solutions to problems of equipment supply, technical servicing of scientific research, as well as to perform capital construction and building repairs. It is imperative to provide all the necessary conditions for creative and efficient work of every scientist.

The USSR Academy of Medical Sciences and personnel of scientific institutions will do everything to perform the major tasks put to medical science and health care by the 26th CPSU Congress.

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MEASURES FOR ACCELERATION OF TECHNICAL PROGRESS DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 30 Aug 83 p 1

[Article by Igor' Glebov, academician, chairman of the presidium of the Leningrad Scientific Center of the USSR Academy of Sciences, Hero of Socialist Labor, deputy of the USSR Supreme Soviet: "Horizons of Introduction"]

[Text] To provide for more intelligent utilization of the country's production and scientific-technical potential and to develop a system of organizational, economic and moral measures which would motivate managers, workers, scientists and designers to update technical equipment--such is the task that was set at the June Plenum of the CPSU Central Committee. Implementing it, our party's central committee and the USSR Council of Ministers a couple of days ago adopted the decree, "On Measures for Accelerating Scientific and Technical Progress in the National Economy." A program of action was approved which will make it possible in practice to combine the advantages of our socialist system with the achievements of the scientific and technical revolution, the implement a unified policy in this area, to increase the responsibility for the technical level of production and product quality, and to utilize more fully the developments of academic and branch institutes and higher educational institutions.

In a word, we are speaking about radical improvement of all the work for accelerating scientific and technical progress. Only under this condition will industry in the next few years provide for the output of products whose indicators correspond to the best modern models, and also introduce progressive technological processes and, on the basis of this, essentially increase labor productivity in the national economy.

The decree of the party and government discusses the need to expand the application of the special-purpose program planning of the development of science and technology, to concentrate the efforts of scientists in the most important areas and to provide for efficient interaction of all units--from fundamental research to the introduction of the results.

I should like to discuss this task especially. Leningrad Scientific Center of the USSR Academy of Sciences was created recently and was called

upon to reduce the cycle of "development--introduction." In essence we are speaking about the creation of a territorial agency for special-purpose program control of the development of scientific and technical progress.

Concentrated in Leningrad and the oblast is an immense scientific and industrial potential which makes it possible to successfully solve not only local, but also unionwide problems. Today Leningrad workers are participating in the implementation of 120 scientific and technical programs which largely determine the country's future. There are 31 scientific institutions of the USSR Academy of Sciences in operation in the city. But up to this point there has not been a single impetus which directs the various research into the main channel. And this, naturally, had an effect on the final results.

Let us take, for example, the timber and wood processing industry. Practically all of the branch science and planning and technological organizations are located in Leningrad. But the fundamental developments, unfortunately, are lagging behind because there is no academic institution. The closed cycle has not come to pass. If we could manage to fill this gap, the entire complex of scientific research and planning work would be much more effective.

Another thing has bothered us. During past decades in our region there has been a certain disproportion in the development of applied and fundamental science. Because of the concerns of the leading branches of the national economy, applied science has taken strides far ahead, considerably outstripping the other organizations. Suffice it to say that the experimental basis for fundamental science as of today, with equal volumes of work, is one-fifth that of applied science. The relative numbers of scientific workers in academic institutions of Leningrad are half as great as in the RSFSR as a whole, and ten-seventeenths that of the country as a whole. At the same time in academic institutions there are laboratories that continue to work on subject matter that is not crucial. This lack of coordination in the activity of scientific organizations which has formed a distance between the various stages of scientific research has made it impossible to fully utilize the Leningrad potential.

And practice, incidentally, convinces us that the greatest effect is achieved precisely where fundamental work which opens up principally new paths of development lies at the basis of research.

I shall refer to the branch in which I work--electrical machine building. As in other spheres of the national economy, we have a system of head institutes. One of these "brain centers" is our institute, VNIIelektromash. Here, work is planned for the entire cycle--from fundamental and research work to the manufacture of the final machines and their series production.

At one time, there was an extremely appreciable chasm between institute research and production. The enterprises could take our order or they could refuse it. The struggle for introduction lasted for years and it certainly did not always end up in favor of new developments. For on the scale of the production, the assimilation of new equipment occupies an extremely insignificant position. How does one motivate the workers? Now the entire subbranch of large-scale electrical machine building has essentially become one scientific production association, with clear cut planning and with a very convenient system for a unified financing fund.

Only under present conditions could we seriously begin to carry out the most important national economic task--the creation of unified types of large machines for the entire country. What does this mean? Throughout the decades individual enterprises have been producing "their own" sets of power equipment which were different from the others. There were the Kharkov, Novosibirsk and Leningrad machines with their individual characteristics. They could not always be joined together at electric power stations with related mechanisms, and there were constant difficulties with spare parts. But the main thing was that the "home grown" designs were frequently not as good as the best world models. So we thought not simply about standardizing existing components, thus achieving some average variant, but also surpassing existing sets of equipment in terms of quality indicators and developing new, improved standard series of machines for the entire branch.

In the practice of introduction this would be a large step forward. For up to this point the majority of scientific developments enter life according to the pattern "institute--industrial enterprise," although it is much more important to learn to introduce them according to the pattern "institute or group of institutes--branch of the national economy."

The decree of the CPSU Central Committee and the USSR Council of Ministers attaches a great deal of significance to increasing the role of the consumers of the products in the development of plans for the creation and production of new technical equipment. To achieve this, the ministries and departments--the head organizations for the various kinds of products--should develop and approve, with the agreement of the ministries that are the main consumers of the corresponding products, future type sizes and systems of machines, equipment and other technology. It is stipulated, incidentally, that the client ministries be responsible for determining in the technical assignments for the development of new kinds of products, indicators which are on a level with the best modern models, and other measures that are dictated by life itself.

The recently published decree of the CPSU Central Committee and the USSR Council of Ministers directs us toward concentrating the creative efforts of scientists. The creation of the Leningrad Scientific Center fully

corresponds to this most important task. During a short period of time it has managed to concentrate scientific research according to 36 coordinated plans. Design work, planning and the creation of new technical equipment are all joined together into one whole, as a result of which the path from the idea to the embodiment, to series production, was shortened.

The regional system of control is under the constant supervision of the Leningrad party organization and the council for the economic and social development of the city and the oblast. All this made it possible to carry out successfully the first task that was set for us: to combine the efforts of scientists in the coinciding scientific directions and achieve mutual coordination of the work that was done. Now it is necessary to change over to the second stage, a more difficult and responsible one--the creation of a complete closed cycle from fundamental research to accelerated introduction of scientific developments. We are speaking not about enclosing science within the framework of an individual region, but about regarding Leningrad industry as a testing ground, providing for solutions to the most important scientific problems for the entire country.

Speaking of the June Plenum of the CPSU Central Committee, Yuriy Vladimirovich Andropov noted with alarm: "Unfortunately, comrades, as you know, our sitatuion with respect to the introduction of the achievements of science and technology into practice seems to be even worse." And the reason for this is not that we have nothing to introduce. We have accumulated many scientific discoveries and inventions and valuable proposals that promise a great economic effect. The problem lies somewhere else: many useful innovations thus remain on the desk or in the laboratory of the scientist. Let me give the figures for our region. Little more than one-third of the inventions are applied in practice. Only one-tenth of the registered inventions are patented. These are our reserves, a truly boundless storehouse of national wealth! The measures presented in the decree of the party and government are directed toward a radical change in this state of affairs with respect to the utilization of the creative potential of researchers.

The system for introduction on the scale of the branch or the subbranch has become more effective. But so far this is true only for the head institutes that are closely related to branch institutes and industrial enterprises of their ministry or department. The opportunities of higher educational institutions and academic institutes are much more limited. They do not have a direct outlet into industry, and therefore this same VUZ science, for instance, has no obligation to introduce its own developments, and they are poorly utilized in the national economy, as was noted in the decree of the CPSU Central Committee and the government regarding

scientific and technical progress. How does one increase the motivation of all participants in research? The most reliable and promising way here is the interaction between VUZ and academic science, on the one hand, and branch institutes and scientific subdivisions of leading associations, on the other, and through them, also with other industrial organizations. The role of the coordinator in the establishment of such contacts should be assigned to the regional scientific center or, in places where this does not exist, the council for economic and social development under the party oblast or city committees.

Here are some concrete, and, it seems, extremely convincing examples. Scientists of the Institute of High Molecular Compounds of the USSR Academy of Sciences and the Physics-Technical Institute imeni A. F. Ioffe have created a new material--super strong polymer threads that are in all ways as good as steel wire. The introduction of the invention into the national economy will produce an appreciable savings on material resources--more than 30 million rubles. But to do this it is necessary to develop special technology and, finally, it is also necessary to have equipment which will provide for the entire technological process. The scientific center has entered into solving the problems of specialists of two Leningrad associations--the Machine Building Association imeni Karl Marks and the Okhtinskoye Polymer Association. They have taken over from the institutes and brought to completion the work that they had begun.

The city on the Neva has traditionally been the center of power machine building, and therefore it is no wonder that Leningrad science devotes so much attention to implementing the unionwide program "Increasing the Effectiveness of the Country's Fuel and Energy Complex up to 1990." We have concretized as much as possible the tasks facing each collective: more than 200 enterprises and organizations of 30 ministries are participating in the implementation of the 1150 stages of this program. As the result of the introduction of 285 scientific and technical developments directed toward improving power equipment with the Leningrad brand, an economic effect of 560 million rubles has already been achieved.

We have approached the implementation of the Food Program just as purposively. Even last year the interdepartmental council drew up the "Coordinated Plan for Scientific Research Work During the Period From 1981 Through 1985 in the Interests of Agriculture." It earmarked the composition of the participants--45 organizations which will conduct research on 43 large subjects. Far from all the proposals were included in the plan. This, incidentally, is one of the ways of accelerating introduction: a differentiated approach to the subject matter and a careful selection of the most promising developments, which prevents unjustified dispersion resources.

Leningrad is the largest science center in our country. Concentration of scientific forces in the main directions and their close link with the industrial base and the labor collectives provide for comprehensive

research and contribute to accelerated introduction into production both on the scale of the region and throughout the entire country. We are directed toward this by the decree of the CPSU Central Committee and the USSR Council of Ministers concerning scientific and technical progress.

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DUPLICATION OF WORK ON INVENTIONS DISCUSSED

/ Moscow MOSKOVSKAYA PRAVDA in Russian 24 Sep 83 p 1

[Article by Ye. Yefimov, candidate of jurisprudence: "In Order Not to Invent What Has Already Been Invented"]

[Text] It sometimes happens that one specialist or another, and sometimes and entire collective, works long and hard on the development of an innovation. And then the work is completed. An application for invention is submitted to the USSR State Committee for Inventions and Discoveries. Time passes and the qualified board of experts for state patents states that the "innovation" has long been outdated and it is well known in our country and abroad.

Not only production workers but also scientific research institutions frequently end up in a similar situation. As statistics show, the reason for about 95 percent of the rejections of applications for invention is the lack of innovation.

The examples can vary here, but they have one thing in common: they invent what has already been invented or they discover what has already been discovered. Effort, time and money are spent in vain. And this usually happens because of an underestimation of preliminary study and utilization of the latest scientific and technical or, as specialists call it, patent information.

In connection with the transformation of science into a direct productive force, now as never before the scientists and engineering and technical personnel have a greater responsibility for raising the scientific and technical level of their activity. This orients scientists and specialists not only toward research and development on a "high level," utilizing the latest world achievements, but also toward prompt legal protection of the results of their work, with the submission of the appropriate applications for invention.

The State System of Patent Information (GSPI) is operating successfully in the USSR. It embraces all republics and 30 base territorial and 1200 branch patent archives have been created. The volume of documentation accumulated there is constantly growing and now amounts fo 600 million storage units. The State System of Scientific and Technical Information (GSNTI) is called upon to provide for daily transmission to the branches and enterprises of data concerning domestic and foreign scientific and technical achievements and advanced practice. The All-Union Patent and Technical Library, the largest in the country, now has many millions of archives of descriptions of inventions and official publications from patent departments of 57 countries of the world in 27 languages, and also foreign literature on patent law and licensing issues.

But here is what bothers us: a considerable quantity of scientific research work is done by scientists without legal protection for their innovations. Apparently it is necessary to increase the responsibility of expert commissions of institutions and organizations and the scientists themselves for the inadmissibility of premature publication of information about work before filling out and submitting the appropriate applications for it under the established policy. It is not inappropriate to recall here that in foreign countries they keep track of the innovations in our scientific and technical literature very attentively and do not miss opportunities to use, "as a favor," soviet technical ideas which certain scientists and specialists immoderately squander in the press before establishing their "civil rights" according to our legislation. Therefore one should not be surprised that some of our innovations subsequently appear here, as it were, in the form of imports. The inadmissibility of the aforementioned practice was noted with complete justification in the Accountability Report of the CPSU Central Committee to the 26th party congress: "It is necessary to figure out the reasons why we sometimes lose our priority and waste large amounts of money on purchasing from abroad the same technical equipment and technology which we are completely capable of producing ourselves, and frequently with better quality."

Incidentally, when justifying premature publication of inventions, certain authors are inclined to refer to the experience of foreign countries, which, they say, extensively advertise their achievements. But, in the first place, not a single advertisement reveals the essence of the innovation since it answers the question "what" and now "how" it was invented. And, in the second place, this allusion has nothing to do with reality.

There are frequent cases in which the submission of applications for invention to the State Committee for Inventions are purely formal in nature. The materials of the applications are filled in with deliberate negligence, without observing the established rules. But in these cases the rejection of the application by the State Committee is immediately regarded by the author as the granting of the "legal" rights to publish the innovation in the press. Thus, what is "ours" becomes what is "mine," as a result of which the state sustains considerable loss.

One frequently hears this demand: the product should be produced on a level with world models! But, strictly speaking, this formulation is inappropriate. This is why. Begin with the fact that there have been no world models as such in nature. The reference to "the level of world models" as a criterion for evaluation is also imprecise. The fact is this: to qualify for a patent and be able to compete means to surpass this level and not simply to correspond to it.

As early as August 1978 by a joint decree of the USSR State Committee for Science and Technology and the Presidium of the AUCCTU, methods were approved for studying, generalizing and introducing advanced experience. In the past authorized agencies have also adopted other normative and legal acts for organizing and disseminating the latest scientific and technical and patent information and advanced experience. It is extremely important that all of these documents are based on the need to differentiate the dissemination of the latest information among enterprises and organizations, taking into account the needs that have been revealed.

Nonetheless, we must still regret that up to the present day we have not eliminated the "gross approach," whereby some information agencies distribute information "to as many as possible," without taking into account the profile of the activity of one enterprise or organization or another.

But what is the situation with respect to the local utilization of patent and market-economic information which is a kind of compass in the work of researchers and developers? In many scientific institutions and organizations of the country, it has long been a rule to have preliminary familiarization with the corresponding patent information. The so-called patent working up of materials regarding a specific problem makes it possible to program the creative search, to conduct it purposively and not to stop with what has been achieved here and abroad.

Unfortunately, many scientists and specialists far from always do this kind of research, and some of them blatently ignore patent information in general or turn to it only from time to time. For the utilization of this information according to present rules is their right and not their responsibility.

And another thing. Scientific institutions are experiencing a clear shortage of market and economic information. Up to this point, the country has not arranged for efficient coordination of market research, and the system of exchange of information between the head institutes and the branches and the academic scientific institutions is on shaky ground.

Apparently, authorized agencies--the USSR State Committee for Science and Technology, the USSR State Committee for Inventions and Discoveries, the USSR Ministry of Foreign Trade and the USSR Academy of Sciences--should introduce the proper order into this matter. An indispensible

part of the system, it seems, should be interconnected measures of moral and material incentives for workers of the information services and also their increased responsibility in all stages of the development and assimilation of new technical equipment.

The GOST, "policy for conducting patent searches," which was approved by the USSR State Committee for Inventions and Discoveries and the USSR State Committee for Standards in November 1982, considerably increases the role and significance of the patent services of the ministries and departments, enterprises and organizations in ensuring a high technical level, patent ability and patent clearance for technical equipment and technology that is developed. The new unionwide standard, which has the force of law, extends to all kinds of patent searches conducted during the planning, creation, production and perfection of objects of technical equipment and technology.

With the adoption of the aforementioned GOST there is a greater need to develop unified unionwide provisions concerning patent subdivisions of ministries and departments, industrial and production associations, enterprises, organizations and institutions, which envision all-encompassing rules for invention and patent-license activity in the chain of "enterprise--association--ministry."

The holder of the record number of patents (more than 1000!), the American inventor T. Edison, when asked the question how he managed to create such an immense number of inventions, answered: "I am able to study what was invented before me!" It turns out that to create something that is authentically new, to invent something, is possible only by leading on the "shoulders of giants," on the previously accumulated experience, while creatively interpreting and developing previously knowledge.

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SOCIO-ECONOMIC ASPECTS OF DEVELOPING NEW TECHNOLOGY

Moscow OBSHCHESTVENNYYE NAUKI V SSSR, SERIYA 2: EKONOMIKA (REFERATIVNYY ZHURNAL) in Russian pp 91-97

[Review by G. G. Ivanov of book "Sotsial'no-Ekonomicheskiye Aspekty Razvitiya Novoy Tekhniki" [Socio-Economic Aspects of the Development of New Technology] by A. A. Sipyagov, Moscow, Mysl', 1982, 263 pages]

[Text] The book (introduction and nine chapters) examines the socio-economic regularities of the formulation and development of new technology, particularly such basic moments of this problem as a study of the national economic effectiveness of automation of production and management singularly and in interaction, the analysis of factors facilitating increased effectiveness of new technology application, and a number of others.

The first chapter studies the mechanism of evolution of the new type technology from the standpoints of technical capabilities as well as their interactions with the processes of functioning of the new technology under conditions of the scientific-technical revolution. The author reveals the essence and complex character of the scientific-technical revolution and defines the conditions and the starting points of the latter, from which there are radical transformations in material production and the non-productive sphere. The interconnection between the development of the scientific-technical revolution and the change in means of labor by which the process of material production occurs, as well as those functions which man implements in the process of production, are examined. In analyzing the processes of labor and its components, the author clarifies the place and function of technology as means of labor in its actually existing interaction with economics. Stressing the fact that it is technology which plays the determinant role in increasing the economic effectiveness of production and in achieving growing economic results, the author notes and isolates the interconnection and conditionality of this process with the system of production relations.

Further, the interconnection of scientific achievement with the capacities of new technology is illustrated. It is noted that a principally new relation arises between science and technology at the current stage. The essence of this relation is that, on one hand, the achievements of science have become a necessary prerequisite for the emergence of new technology and the development of the worker himself;on the other hand, technology affects science, pre-

senting it with new problems associated with the needs of production and exposes the modern tooling necessary for conducting experimental research and developing its results.

The author presents a description of three basic qualitative stages in the development of technology, which are accompanied by a sharp increase in labor effectiveness. At the first stage, man transmits various actuating functions to the work machine; at the second -- man is no longer the source of energy during movement of the labor tools and gives these functions over to moving machines; at the third, current, stage of production development, the machine is the active means of replacing not only physical, but also elements of mental labor. It is stressed that at any stage of evolution of technology, the objective motivating force of its development is the ever-increasing needs of society, which increase faster than technology develops. The expansion of the emerging contradictions between the growth in society's demands on the one hand and man's capabilities on the other, is in the opinion of the author that basis which leads to a gradual transmission of its functions to technical devices and to a change in the very character of man's functions in production. In analyzing the progress of the machine, the author studies the process of formation of the three-segment machine complex (machine engine, transmission mechanism, machine tool or working machine) and the process of its transformation into a four-segment complex as a new type of technology consisting of four subsystems: working, energetic, transmission, and controlling.

The second chapter presents an expanded description of the evolution of new technology with an analysis of the tendencies for development of each component part of an automatic machine system, its development within the system, and the generalized development in production, power, auxiliary and control automated systems. Studying the tendencies of effective development of operating machines, the author analyzes the process of its transformation to an automatic system, which as an altered work tool affecting the object of labor and nature, itself represents a four-segment system consisting of the machine-tool, the energy installation, the transmission and control mechanisms.

The third chapter is devoted to problems of socio-economic effectiveness of new technology. The author gives an analytical overview of various economist's viewpoints on the question regarding the criteria of national economic effectiveness, stressing the necessity for a methodological plan for delineating the effectiveness criterion and the indicators in which this criterion is expressed. The importance of delineating the concepts of "effectiveness criterion" and "optimal criterion" is stressed. The essential determination of each of them is formulated and a description of the "external" and "internal" indicators for effectiveness of new technology in determining the expediency and boundaries of its application is given. Among the external indicator the author relates those which make it possible to give an evaluation of the organization of new technology application from the standpoint of the national economy. Among the internal indicators are those which express the interests of an individual production collective (cost accounting effectiveness). Noting the expedience and need for considering the social consequences of new technology, the author stresses that from the social standpoint, such a

technology is effective which ensures the rational functioning and development of socialism as a social system and facilitates the decision of social problems facing society, the achievement of the goal of social development, and the formulation of the well-rounded man.

In analyzing the systems of indicators for cost accounting and national economic effectiveness, the author points out the fact that the determinant role in the formation and development of principally new technology must by played by its national-economic significance, which is determined by an increase in the newly created cost and additional totality of those material benefits in which it is embodied, i.e., by the size of pure social product. The author believes that national economic effectiveness of new technology must reflect the results of activity not only in the direct process of production, but also in the sphere of distribution, trade and consumption, and that it must be examined not only from the standpoint of rational utilization of all available resources for achievement of the production goal in specific historical conditions, but also from the standpoint of development of the entire socialist society as a whole.

The fourth chapter presents the basic directions and methods for improving the system of effectiveness indicators for new technology, which is expressed in two forms -- in the utilization of the consumer properties of the new technology and in the change in the qualitative aspects of production and social life of society. The determination of the effectiveness and the indicators for measuring it are given separately for automatic systems of machines for production and automated control systems. The principle basics for determining the economic effectiveness of automatic machine production systems are given in a detailed and comprehensive manner, with a presentation of the methodology of specific formulas and examples of computations. The basic indicators of economic effect are recommended as: a) for the national economy -- the growth in the national income obtained as a result of the functioning of automatic machine systems; b) for the sector, association or enterprise -- the absolute and relative growth in net production; in determining the annual economic effect and tools for stimulation -- the growth in profit (change in product production cost).

The methodological principles for determining the effectiveness of automated control systems are based on the following two positions: a) the need for determining the effectiveness of a new organization of control systems and their improvement; b) the need for determining the effectiveness of application of modern technology directly in management.

The fifth chapter presents the basic directions for the development of effective means of automation. Among the basic directions, the author examines the development of the technical base for automation of production (the introduction of machine tools with program control, systems of machine tool control with a control panel with digital electronic computer, etc.), improvement of automatic flow lines and creation of modular highly effective machines (creation of block automatic complexes, creation of multi-functional machines and equipment, development of new machines, etc.).

The sixth chapter is devoted to problems of improving technology and objects of labor with the use of new engineering. Studying the interdependence between the development of progressive technology and automation of production, the author uses practical examples and computations to show how the improvement of technology based on the application of the latest scientific achievements with the broader introduction of chemical, power and electrotechnical processes predetermines the rate of development of automated complexes and systems. As one of the most important reserves for increasing the productivity of automated complexes and improving quality and reliability of the products manufactured on them, the author notes the need for preparing the product itself, the object of labor, for the automation process. This is generally associated with a) partial alteration in the construction of the product and its preparation for automation; b) the creation of a principally new product which is processed according to the new technology.

The seventh chapter examines the problems of increasing the effectiveness of automated control systems having their own technical and informational base. Analyzing the development of the technical base for control automation, the author characterizes the make-up of the national economic and sectorial pool of electronic computer equipment and the utilization of its capacities. It is stressed that along with the insufficient number of electronic computers in the national economy, in practical application their capacities are not fully utilized. Therefore, in order to increase the effectiveness of electronic computer application it is necessary to have the entire series of machines with different technical-economic parameters and to sharply expand the practice of using small computers and their interaction with large computers. This, in the opinion of the author, will make it possible to expand the automation of control activity and will enable the creation of automated control systems at all levels -- from the enterprise to the all-state automated system of accounting, planning and managing the national economy.

In characterizing the basic directions for improving the forms of automated control systems application (eighth chapter), the author gives an in-depth analysis of the changes in organizational forms of creation and application of automated control systems depending on the emerging disproportions due to disruption of work plans of the managed objects. He also determines the basic means for improving the economic mechanism of automatic control system functioning and its planned transition to a new level of organization and management ensuring the development of the entire economy from a single center through the appropriate system of economic management organs.

The ninth chapter examines the socio-economic consequences of widespread application of new technology. The author notes the complex and varied character of the effect of new technology and stresses that its development may greatly be hindered or stimulated by the existing production relations. Based on the analysis of extensive statistical material, he analyzes the effect of new technology on the development of concentration and intensification of production socialization processes, particularly such forms of production organization which make it possible to close the cycle of "scientific

research - production" in a single complex as the creation of scientific-production association, production associations based on automated technology, etc.

12322
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MANAGEMENT OF SCIENTIFIC-TECHNICAL PROGRESS UNDER DEVELOPED SOCIALISM

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIYA 6: EKONOMIKA in Russian No 4, Apr 83 pp 101-102

[Review by F. M. Rusinov of book: "Upravleniye Nauchno-Tekhnicheskim Progressom" [Management of Scientific-Technical Progress] edited by G. Kh. Popov, Moscow, Ekonomika, 1982, 304 pages]

[Text] Scientific-technical progress (STP) is the most important factor in the intensification of social production. It was stressed at the 26th CPSU Congress that "the conditions under which the national economy will develop in the 80's make the acceleration of scientific-technical progress ever more urgent."* Mastering the achievements of the scientific-technical revolution is one of the key moments in the current stage of development, while the combination of these achievements with the advantages of the social system of economic management is the most important economic and political task. Transforming science into a direct production force leads to the situation whereby the role of science becomes determinant in the comprehensive intensification of production, which makes it possible to successfully solve the basic problem of socialist production -- the more complete satisfaction of material and spiritual demands and provision of further growth in the well-being of the Soviet people.

The initiative of scientists at the Center for Problems in Management of Social Production at Moscow State University economics department deserves full support. [These scientists], along with scientists from the USSR Academy of Sciences, the USSR Academy of the National Economy, certain VUZes and a number of practical workers, have prepared an interesting publication entitled "Management of Scientific-Technical Progress," and selected by the USSR Minvuz [Ministry of Higher and Secondary Specialized Education] as a textbook for students in economic specialties at VUZes.

At the present time, one can hardly doubt the importance and expediency of studying the problems associated with economics and the management of scientific-technical progress, training of qualified specialists in economics and organization of scientific-research and experimental design work. However, the study of these questions is currently being implemented within the framework of individual study courses such as Organization of Planning and Management of the National Economy, Industrial Economics, and others. The need has arisen for introducing special courses related to study of the problems

*Materials of the 26th CPSU Congress. Moscow, 1981, p 42.

of economics and STP management into practical instruction of higher education. Therefore, the appearance of this textbook creates a real methodological base. Many graduates of economics VUZes, particularly VUZes located in major industrial and scientific centers, will subsequently work in scientific organizations, in scientific-production associations, and in subdivisions of the ministry and department apparatus. Their practical activity will be associated with the management of innovative processes and their training on the basis of this text will facilitate more effective work.

What allows us to positively evaluate the educational text under consideration? First of all, we must note its successful structure, which is based upon a comprehensive approach. All the key problems of STP management have gone into this text. The first section is devoted to general methodological problems, where the specifics of STP management are determined by its peculiarity as an object of management, the scientific-technical potential is isolated as the statistical description of STP, and the innovative cycle "science-production-consumption" is defined as the dynamic description. It is important to note that STP is examined with consideration for the modern global problems: ecological, power, produce, and others. The second, third and fourth sections are devoted to problems of management with consideration of levels of hierarchy. Thus, the second section examines problems of STP management at the level of the national economy, the third -- sectors and regions, the fourth -- management of research and development of scientific organizations. Such an examination of the methodological and practical questions gives this text a comprehensive character and makes it possible to concentrate attention on the basic organizational and management aspects. The fifth and concluding section is devoted to questions of scientific-technical international cooperation and to an analysis of foreign experience in STP management in socialist as well as in developed capitalist countries.

As a positive aspect of this text, we must note that in the practice of socialist economic management, the system of STP management is in a state of constant development, and certain functions of STP management have not yet been completely formulated. The authors present organizational structures and methods of STP management which have already proven themselves in practice and attempt to show that which is already functioning and being used effectively in the practice of economic management. The authors also do not avoid analysis of complex, as yet unsolved, questions, give recommendations for detecting ineffective segments, and substantiate variants of possible solutions, and various management alternatives for further improvement in STP management. As successful examples we may name the analysis of variants for further improvement in the management of scientific-technical programs (§ 6.3), methodologies for evaluating socio-economic effectiveness of STP (§ 8.2), and questions associated with intensifying the regional aspect in management of STP (§ 12.2).

Concentrating attention on a number of unsolved problems in STP management makes it possible to conclude that this text may subsequently be suitable not only for students of economic VUZes, but also in training and increasing the qualification level of specialists and management supervisers at VUZes and institutes for improvement of qualifications.

While evaluating the reviewed text in a positive manner, we must note certain shortcomings inherent in the work and express our hopes for its further improvement.

Undoubtedly, not all paragraphs of the textbook have the same depth of study, argumentation, and informational value. For example, the material on methods of STP management (§ 4.2) is oriented toward general positions without sufficient analysis of the specifics of methods determined by the peculiarities of STP as the object of management. Chapter 7, which is devoted to the organization of socialist competition for accelerating STP and attracting workers to STP management is overly declarative. The specifics of organizing socialist competition at the scientific-research institutes and design bureaus is insufficiently illuminated.

Certain important questions are left without sufficient illumination in a number of chapters in the textbook. For example, the territorial aspects of STP management (chapter 12) are essentially reduced to the territorial organization of science. The important methodological question of determining the essence of a region's scientific-technical potential is left without examination. This chapter presents interesting material which studies the experience of individual republics, krays and oblasts, however, unfortunately without a sufficiently clear theoretical generalization of the existing mechanism of STP management for solving the problems of development of regional productive forces. The section on management in scientific organizations lacks material determining the effectiveness of action of subsections and individual workers, and no recommendations are given for the stimulation of their work (interesting experience in such evaluation has been accumulated at a number of academic, VUZ and sectorial scientific organizations). The examination of these questions is quite useful for future economists.

There is an absence of material dealing with progressive methods of planning research and development. In particular, there are no recommendations for utilizing grid models in planning and other quantitative methods used for predicting the development of science and technology, as well as methods of functional-cost analysis. Subsequently, in the preparation of a new edition of this educational textbook, a special section should be added which would illuminate economic-mathematical methods which are widely used in the practice of research and development management.

The reviewed textbook does not elucidate fully and clearly enough the questions of effectiveness of utilizing the scientific-technical potential and the socio-economic effectiveness of scientific-technical progress, which are of primary and principle importance. They should be solved on the basis of the resource-potential approach, and not simply based on the attained level, as is proposed in most cases in the given text.

Unfortunately, the textbook lacks material on such an important question as plan price formation for new production and for informational products as a result of the work of scientific organizations. Possibly the author's collective will consider these wishes in the new edition of the textbook.

Its exceptionally small publication volume (only 8,000 copies) also speaks in favor of reprinting the reviewed text, as it has immediately become a bibliographic rarity.

On the whole, the reviewed text may be evaluated positively, and the initiative of the publishing house which decided to print it may be called timely and quite useful.

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BOOK ON SCIENCE IN SOCIALIST COUNTRIES REVIEWED

Moscow PLANOVOYE KOHZYAYSTVO in Russian No 7, Jul 83 pp 117-118

[Review by V. Zhamin, doctor of economics, professor, of the book "Upravleniye nauchno-tekhnicheskim razvitiyem pri sotsializme" [Control of Scientific and Technical Development Under Socialism] ed. by V. N. Arkhangel'skiy, Moscow, "Progress", 1982, 294 pages]

[Text] In the age of the scientific and technical revolution, the scale and complexity of national economic problems that are solved are steadily increasing, and the effectiveness of international scientific cooperation is also increasing. Here the influence of control on the acceleration of the rates of scientific and technical progress (NTP) also becomes stronger. In recent years, international scientific and technical cooperation, and primarily cooperation among the CEMA countries, has been transformed into a complex system with a great diversity of economic and organizational ties. More complete utilization of the possibilities of socialist division of labor in the sphere of science and technology creates the need to develop a unified scientific and technical policy for the socialist countries, to improve the methodology for the integration of plans for the development of science and technology, and to apply coordinated methods of planning and control of scientific research and developments. The book under review is interesting from this standpoint. It has undertaken an attempt, on the basis of socialist principles of administration, to develop a system of control of the development of science which is common for all the CEMA countries, which makes it possible to fully utilize one of the main advantages of the socialist economy--planning.

In the first section, the authors--V. N. Arkhangel'skiy, F. F. Glistin, I. P. Leshkin, B. F. Zaytsev (USSR), D. Schulze (GDR) and S. Shefler (Poland)--consider the theoretical issues of increasing the scientific and technical potential (its constituent parts and indicators of measurement), and the formation of a scientific and technical policy which is the same for all CEMA countries. They propose a mechanism for integrating the plans for scientific and technical development of individual countries and their connection with national economic plans. The analysis of the results of the

scientific and technical cooperation of the CEMA countries is of great interest to scientific and practical workers who engage in planning and control of NTP.

Singling out applied research and development as a most important source of increasing the efficiency of public production, the authors formulate conditions whose observance will provide for further integration of the scientific and technical developments of the socialist countries. Among them they especially emphasized the need to form a national scientific and technical policy, taking into account socialist division of labor and planned exchange of scientific and technical information. They express a desire for equal participation of the countries in the financing of scientific research work and deductions for these purposes in an equal proportion of the national income.

They note the importance of long-range planning and more extensive utilization of special-purpose program methods which make it possible to coordinate the goals of the development of the economy and the possibilities of science, and they point out the need for centralized planning of the largest developments and also a comparative evaluation and selection of scientific and technical problems that are directed towards carrying out common socio-economic tasks.

A large amount of attention is devoted to the system of indicators of scientific and technical progress which embraces planning, financing, evaluation of effectiveness and economic stimulation in scientific organizations and at industrial enterprises.

The authors tried to coordinate the problems of the development of science with the existing mechanism for long-range planning of scientific and technical progress and present the basic theoretical conclusions that pertain to the system of control of science.

The second section--authors: V. Grolmus (Hungry), B. Benev, G. Mladenov (Bulgaria), A. Ye. Varshavskiy and N. I. Komkov (USSR)--is devoted to the develoment of scientific and technical predictions and long-range plans. A central place in it is occupied by the methodology for preparing the comprehensive program for scientific and technical progress for twenty years, the preplanned document which reflects the state scientific and technical policy, and special-purpose scientific and technical programs.

All these elements are considered in their interconnection. Under the conditions of socialist production relations, prognosticatory activity makes it possible to develop the national concept of scientific and technical progress. The predictions give an analysis of world and national scientific and technical development and an evaluation of the condition of individual branches of science and technology within the framework of the division of the problematics of scientific research that has been adopted in the socialist countries.

Consideration is also given to ways and possibilities of utilizing interrelated scientific and technical predictions when developing the comprehensive program for scientific and technical progress for twenty years.

With the modern scale of economic construction, the principles of special-purpose program planning play a decisive role in scientific and technical development, especially when implementing interbranch, regional and interbranch, regional and interstate scientific and technical programs. This aspect of special-purpose program planning has been poorly studied and is not discussed completely enough in scientific literature. The book fills the gap, which can be a point of departure for futher improvement of the control of scientific and technical progress in socialist countries which, in our opinion, is of methodological and practical value.

The third section--authors: L. Santo, M. Tolnai (Hungry), V. N. Arkhangel'skiy, G. A. Lakhtin, V. A. Pokrovskiy (USSR), Ye. Langner, G. Khefner (GDR) and M. Dombrova--contains an analysis of the planning and economic mechanism for control of scientific and technical development. It devotes special attention to planning. Two methods of forming plans which are utilized in socialist countries are described: decentralized, whereby the scientific organizations are given considerable independence in the selection of the subject matter for research, and centralized--on the basis of clearly formulated tasks for the planned period.

Questions of organizing the control of science in socialist countries and the functions of planning agencies of the national economy, the region, the ministry and the individual organization (enterprise) are discussed in detail.

A great deal of significance is attached to overcoming the organizational and economic difficulties in the stage of realizing the results of scientific and technical achievements of the branches of the national economy, regions and industrial enterprises. Methodological approaches are considered for determining the effectiveness of science at various levels of management. With the modern scale of solutions to scientific and technical problems and the requirements for intensification of production, this becomes exceptionally important.

This section elucidates the methods for determining the effectiveness of scientific research. It earmarks the main shortcomings of the existing methodology, which takes into account only the economic effect, leaving to the side the change in the indicators of effectiveness in time and their probability nature, as well as the shortage of individual kinds of released resources when introducing the results of scientific and technical work (NIR). Considering the methodological approach to measuring the social results of the latter, the authors suggest taking into account expenditures that are necessary for obtaining a unit of social effect or social normatives. In their opinion, in order to evaluate the scientific and technical

effect of scientific research work, one can utilize a system of indicators that makes it possible to formulate an integrated evaluation--the coefficient of scientific and technical effectiveness. Individual indicators (the scientific and technical level of the expected results, their prospects, the expected time periods and scope of introduction) can be evaluated in points with the establishment of the "weight" of each indicator in the system.

The monograph makes an attempt to determine the effectiveness of the functioning of scientific complexes that consist of a totality of organizations for science and scientific service. To do this, it is suggested that one use indicators of the economic effectiveness of expenditures on science, the effectiveness of scientific and technical progress and the main kinds of resource.

The book successfully generalizes the rich, positive experience of scientists of the socialist countries in the area of controlling scientific and technical progress, and an attempt is made for the first time to reduce individual proposals into an intercoordinated system of administrative measures which is constructed on socialist principles of management. But certain sections, for example the one for evaluation of the scientific and technical potential (author: S. Shefler) and the one devoted to the methodology and practice of scientific and technical prognostication (author: V. Grolmus) are basically informational in nature. Nonetheless, the overall scientific level of the book under review is not lowered because of this.

Evaluating the book as a whole, one can conclude that it generalizes the processes of improving the methodology and practice of scientific and practical development in the socialist countries and the organizational and economic forms of international scientific and technical cooperation.

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COOPERATION BETWEEN USSR, VIETNAM CITED

Moscow ECONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 7, Jul 83 pp 41-43

[Article by Le Zung of CEMA Secretariat in the column "Scientific-Technical Cooperation;" "Scientific-Technical Cooperation Between the SRV and the USSR"]

[Text] At the present stage of the Vietnamese revolution, as in previous stages, solidarity with the Soviet Union and other countries of the socialist friendship is the cornerstone of the Vietnamese Communist Party (VCP) policy. As Comrade Le Zuan, the secretary general of the VCP Central Committee pointed out, this is a principle, a strategy and, at the same time, a revolutionary inspiration.

Building socialism in the SRV calls for creating a material-technical base within the country and a transition to a large-scale socialist economy. With these conditions, the main directions of the country's foreign economic activity lie in expanding and strengthening the all around interaction with the USSR and in developing cooperation with other CEMA member countries on the basis of socialist economic integration, active participation in the international division of labor, specialization and production cooperation in different sectors of the economy.

One of the important areas of highly effective ties with the USSR is science and technology. It began in 1959 with an intergovernmental agreement between the two fraternal countries. It called for an exchange of scientific and technical documentation and information, mutual exchange of specialists to become familiar with the achievements in industry, mining, agriculture, the maritime industry, transportation, public health, and scientific research.

The cooperation between the SRV and the USSR has continually improved and developed, even during the years of the harsh war against American agression. The USSR has played an active role in building up Vietnam's scientific potential. The USSR laid the foundation for scientific-technical progress in our country and enabled us to solve many complex problems effectively. Putting new production into operation with advanced equipment and technology based on the documentation obtained free of charge from the Soviet Union has given the SRV the opportunity to obtain significant savings in time and resources.

The results obtained during the development of scientific-technical ties have made a great contribution to the Vietnamese people's heroic victory over the American agressors and the Saigon administration; they have helped and are helping in the building of socialism.

The assistance in training and raising the qualification of scientific-technical personnel is a clear example of the USSR's truly internationalist relationship. In 30 years, the Soviet Union has trained approximately 19,000 specialists, including 2,000 scientists of whom 40 are doctors of science, for the SRV.

In 1976-1980, 788 Vietnamese specialists received technical and vocational training and raised their qualifications. Two hundred and fifty nine Soviet specialists were assigned to the SRV for technical assistance and joint research. The Soviet Union has given the SRV 146 complete sets of documentation, mainly for agriculture, land development and water management, and also, 114 product samples, scientific instruments, materials and reagents.

The cooperation with the Soviet Union has created the conditions for successfully putting the output of new types of industrial products (metal-cutting machine tools and instruments, diesel engines and self-propelled ships made out of reinforced cement) into operation and has helped to improve their quality.

Measures for increasing coal and tin mining, organizing the optimal production routine for green and black tea production and the method of processing natural rubber have been planned. Part of this production takes place in the Soviet Union and other CEMA member countries.

A great amount of work is being done on using space technology for scientific research in solving national economic problems. Much has been done to strengthen the material-technical and information basis for science in the SRV.

Putting the joint research program into effect has already produced favorable results. One of them is the successful flight of the Soviet-Vietnamese crew in the space vehicle, Soyuz-37, in June, 1980. The Lotos Ground Station, which has become part of the International Satellite System, was built in Vietnam to conduct space flights and receive meteorological information from earth satellites. It provided reliable telephone and telegraph communication and even reception of television transmissions from the USSR and other countries of the socialist friendship.

The SRV's admission into CEMA in 1978 marked a new stage in the SRV's multifaceted cooperation with the USSR and other CEMA member countries on a multilateral and bilateral basis.

The resolution of the CEMA session (the 33rd meeting) to disseminate to the SRV the principal positions of the comprehensive program as it has been planned in relation to the Mongolian People's Republic and the Republic of Cuba, to accelerate the development and increase the effectiveness of the SRV's national economy for progressive convergence and equalizing the level of its economic development with the other CEMA member countries is very important.

The conclusion of a treaty of friendship and cooperation in 1978 between the SRV and the USSR which gave a new impetus to the development of scientific-technical cooperation between the two countries was a great political event. A number of interdepartmental and sectorial agreements were signed in accordance with the treaty.

The Vietnamese Communist Party (VCP) and the SRV government have given and are giving the most serious consideration to improving interaction in the area of science and technology and to increasing this area's effectiveness.

The present stage requires a transition from coordinating plans to drawing up a coordinated policy of the CEMA member countries. The decree of the presidium of the VCP Central Committee, adopted in April, 1981, noted that, in the development of international cooperation, it is necessary to choose the priority directions and to conduct joint research on the problems (topics) which are of mutual interest. Special attention must be paid to coordinating scientific-technical cooperation with industrial cooperation, with the condition that the former must develop at the leading rates and serve as a prerequisite for the expansion of the latter.

Two directions are specified for solving these problems. It is a matter of further concentration of the efforts of the sides involved on the most important problems and organization of interaction based on the system programming planning method, which encompasses the entire cycle of science, production, and sales.

Presently, together with the types of ties which pay for themselves, such as giving technical aid, obtaining documentation, exchanging production know-how, and others, more attention is being centered on coordinating research and cooperation and conducting consultations on the basis of scientific-technical policy and joint measures for putting DTsPS [expansion unknown] into effect. As a result, cooperation is becoming more complex; it encompasses sectors and is based on a long-term planned basis.

The USSR and SRV's mutual consultations on coordinating national economic plans in 1981-1985 were an important step. During the consultations, a plan for scientific-technical cooperation was signed for the current 5-year plan period; the plan includes 86 topics which play a significant role in the SRV's economic, scientific and technical development. The topics are concerned with working out the food program, advancing the key sectors (the energy, fuel-raw materials, mining and chemical industries, and also machine building), and increasing consumer goods production and exports.

Special significance is given to comprehensive use of the potential possibilities of the SRV's tropical agriculture and forestry, increasing mining of coal, tin and other minerals, and products of the maritime industry, that is, goods which are supplied to the USSR and other CEMA member countries. Joint work is also being conducted in the areas of public health and standardization.

The program of cooperation in agriculture and land development has the purpose of solving the urgent problems connected with seed growing and agricultural technology, harvesting and processing agricultural products, the yield of food

crops and vegetables, and increasing labor productivity in sectors. This aids the development of agriculture and its gradual transition to the method of large-scale socialist production with an efficient agrarian industrial structure.

The signing of the agreement between the SRV and USSR Ministries of Agriculture to create experimental seed-growing bases in the northern and southern parts of Vietnam and also the joint research being conducted by the specialists of the two fraternal countries have opened new opportunities for creating breeding funds.

A large-scale public health program has been agreed upon. It calls for coordinating the efforts of medical personnel to eliminate tropical diseases (malaria, the plague, filariasis, amebiasis, and meningococcal meningitis) and the aftereffects of the USA's chemical and bacteriological war in Vietnam.

Joint work is being conducted on cultivating medicinal plants; solasodine, fiosteline, rauwolfia, and stephania. The appropriate intergovernmental agreement was signed in November 1978.

In geodesy and cartography, special consideration is being given to producing high-prevision physical geodetic and gravimetric networks on the SRV's territory, to using materials detected by earth satellites, and to study the process of the earth's formation of cracks.

The agreement which the State Committees for Science and Technology signed for sounding from space allows the Vietnamese side to use Soviet photographs and data from satellites in geological work, prospecting for oil and gas, meteorology, agriculture and the maritime industry, and in construction, etc.

In meteorology, for example, a joint program is being implemented for research on the tropical climate and hurricanes. In compliance with the intergovernmental agreement of March 1980, a joint Soviet-Vietnamese scientific-experimental laboratory has been established in Hanoi. Vietnamese and Soviet specialists are working together, hand in hand, in its construction and assembling of equipment and instruments.

In the area of energetics, effective measures for protecting electric power lines against lightning are being worked out. The creation, manufacture and testing of the equipment and instruments are being completed. Anti-lightning defense laboratories' construction will be carried out in Za Shang Region (Tkhay Nguyen Province).

The basic directions for scientific-technical cooperation in the areas of standardization, metrology and production quality have been agreed upon for 1981-1985. Putting them into practice will help improve and draw together the national standardization systems, improve production quality, and create favorable conditions for barter and active participation in the international socialist division of labor, in specialization and cooperativization of the production of the CEMA member countries.

To successfully implement the social-economic tasks confronting the SRV at its present stage, the personnel problem has acquired a special significance. In January 1981 the SRV and USSR governments signed an agreement for cooperation in training and improving the skills of the Vietnamese management personnel and specialists in the area of managing the economic system in 1981-1985. In that period, 1,400 specialists from average and high sections will be trained in the USSR. Sixty Soviet scientists are being sent to the SRV to give lectures and conduct consultations in VUZ's and in specialized courses.

The audience of the courses are extending their understanding of Marxist-Leninist theory and the problems of managing the national economy. Special attention is given to learning the USSR's advanced know-how and creatively applying it to Vietnam's conditions.

The scientific-technical cooperation between the SRV and the USSR has also been reflected in a number of other intersectorial agreements. They include prospecting for and production of oil and gas on south Vietnam's continental shelf, development of the fishing industry, stepping up geological prospecting for the period up to 1990, scientific cooperation between the Ministries of Culture, the use of atomic energy for peaceful purposes, the study of outer space and cooperation in radio and television and other areas. To put these into effect, the Soviet Union, at the request of the SRV, has delivered instruments and equipment for conducting joint research.

The highly effective ties between the USSR Academy of Sciences and the SRV National Center for Scientific Research have developed fruitfully. The joint work encompasses such areas of importance to the SRV national economy as geology, geography, oceanography, biology, physics, and tropicalization. The USSR has proved to be a great help to the SRV in supplying a number of institutes of the National Center of Scientific Research and Hanoi Polytechnic Institute with advanced instruments and equipment.

The plan of cooperation between the USSR Academy of Sciences, on one hand, and the SRV National Center of Scientific Research and the Committee for Social Sciences, on the other, calls for joint working out of 27 problems (73 topics) in the most important areas of natural and social sciences.

Vietnamese and Soviet scientists have organized expeditions to study the SRV's fauna and flora, the ecological and geographical population on the Tkhay Nguyen Plateau and other regions in the SRV. Botanists of the two countries are conducting a great amount of work in gathering a collection and putting together an atlas of the plant world. Specialists in the area of marine biology and oceanography are pursuing a joint study of the seas bordering the SRV's coast. A national atlas of the SRV is being compiled by collective efforts. Great attention is centered on the basic geological structure and the distribution of minerals in its territory. Joint studies are being carried out in the areas of mathematics, cybernetics, nuclear and space physics, and others.

In the social sciences and humanities, efforts are being concentrated on the problems of philosophy, history, philology, ethnography, archeology, economics, and law, etc.

The conformance to the principles of the development of the socialist revolution and the features of the period of transition to socialism in the SRV are being studied jointly. This helps develop the scientific bases of socialist transformations and building of socialism in the country as specified in the 4th and 5th VCP Congresses.

Multilateral interaction is also being developed intensively. In accordance with the general agreement signed within the CEMA framework in January 1981 for assistance in accelerating the development of the SRV's science and technology for the period up to 1990, the USSR will give Vietnam technical assistance in supplying the Center of Testing Agricultural Technology, the Scientific Research Institute of Mechanization of Agriculture, and the Scientific Research Institute of Communications with instruments and equipment. The Soviet Union also participates in solving seven problems whose solutions are intended to ensure maximal use of the SRV's natural resources in order to achieve further integration of the SRV's economic system with the economic systems of the other fraternal countries.

In conclusion, I would like to dwell on the mechanism of interaction.

As the centralized agency of management, organization and coordination of scientific-technical cooperation with foreign countries, the SRV State Committee for Science and Technology (SCST) maintains permanent contact with the corresponding department in the USSR. A great amount of work is also being conducted within the framework of the Intergovernmental Commission for Economic and Scientific-Technical Cooperation.

In accordance with the protocol of June 1976, the USSR SCST gives the SRV SCST comprehensive help in planning the development of science and technology and scientific-technical data, and also in the areas of standardization, metrology and quality, and development of inventions, etc. Soviet scientists and specialists conduct consultations on creating an efficient structure of scientific-research organizations in the SRV and increasing the effectiveness of their work, on questions of planning and financing scientific research and training personnel, and assimilating the results of scientific developments into the national economy.

In 1980, the USSR SCST sent a large group of specialists to the SRV to assist in working out the basic directions of the long-term development of the SRV's science and technology and also in preparing the project of the SRV State program for scientific-technical progress in 1981-1985 and the period up to 1990. The program has been approved by the SRV Council of Ministers and has now been successfully put into effect.

A treaty was concluded to send specialist-consultants to the SRV to give assistance in putting the State program for developing science and technology into effect. Joint work is being planned in the area of prediction, which will become the basis of the strategy of developing the SRV's science and technology.

Putting the measures planned in the plans of scientific-technical cooperation between the SRV and the USSR in 1981-1985 into effect will contribute to

successfully accomplishing the tasks specified by the 5th VCP Congress for building socialism in the SRV and devoping its economic system, science and technology.

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